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Uncharted waters:
A behavioral approach to when, why and which organizational changes are adopted

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A behavioral approach to when, why and which organizational changes are adopted

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Stephen King (2000) has a clear demonstration of what it takes to write in “On Writing”. He starts his advice by telling an anecdote of when he helps his uncle replace a broken screen. Instead of bringing the only tool that is necessary for the job, his uncle asks Stephen to bring the toolbox with him. When Stephen asks him why he had to bring the entire toolbox, his uncle replies “I didn’t know what else I might find to do once I got out here, did I? It’s best to have your tools with you. If you don’t, you’re apt to find something you didn’t expect and get discouraged.” (King, 2000: 114). Thus, King concludes, “To write to the best of your abilities, you have to construct your own toolbox and then build up enough muscle so you can carry it with you. Then, instead of looking at a hard job and getting discouraged, you will perhaps seize the correct tool and get immediately to work.” (King, 2000: 114)

Xavier Martin, you showed me this toolbox. You showed me its endless, ever-expanding layers, the tools that are in there and how to use them. I understand I shocked you by dropping the bomb of “not pursuing a research-oriented career in academia”, but your efforts are not in vain. This toolbox can be applied elsewhere as well. I’ll have to carry it in different areas now. But who knows, perhaps I someday will return with an even more complete toolbox.

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Roland Levering (I wouldn’t dare to get your name wrong). Why, oh, why did I *volunteer* to share an office with you. The plants, yes, the answer may lay in the plants. No,

jokes aside (which is a huge pile), it was a pleasure sharing an office with you. Little that you know, mayhap the dissertation would not have been finished if wouldn't have joined you in your office (or, it would have been finished years ago). Seriously, I should stop the jokes and get to a proper acknowledgement here. So here you go: thank you! (Sorry I can't put a gif in here!)

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mechanisms, I believe that without you I wouldn't be able to stand where I am today (who could I have had as a paranymph otherwise?!).

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Now, I encourage you to read further. Yes, you reader, don't put it down after having read the acknowledgement section. Yes, the rest of the dissertation is less emotive as this acknowledgement section, I give you that, but I am sure there are some things in the essays that would perhaps enlarge your toolbox as well.

Go at it. Give it a shot.

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Chapter 1

Introduction

The essence of the strategy concept entails "the dynamics of the firm's relation with its environment for which the necessary actions are taken to achieve its goals and/or to increase performance by means of the rational use of resources" (Ronda-Pupo & Guerras-Martin, 2012: 180). Fundamental to strategy is thus how a firm can retain fit with its environment amidst changes in either. This dissertation aims to contribute to the nexus of strategy and organizational change by studying when, why and which organizational changes are adopted, primarily from a behavioral perspective.

The organization theory and strategic management literature have long explored organizational change, which is defined as "change in how an organization functions, who its members and leaders are, what form it takes, or how it allocates it resources" (Huber, Sutcliffe, Miller, & Glick, 1995: 216). A variety of theoretical perspectives have explored this phenomenon, including population ecology (Hannan & Freeman, 1984), institutional theory (Greenwood & Hinings, 1996), organizational learning (Kelly & Amburgey, 1991), and behavioral theory of the firm (BTOF) (Cyert & March, 1992). In this dissertation, I adopt a behavioral approach. In contrast to the other theoretical perspectives just mentioned, this approach puts the decision-maker as a human at the forefront and analyzes how said individual makes decisions pertaining to organizational change.

The main assumptions of this dissertation are fivefold. First, decision-makers satisfice instead of maximizing (Cyert & March, 1992). They are driven by the attainment of the aspiration level of one or more goals and will choose the first alternative that is deemed

satisfactory from that standpoint (Gavetti, Greve, Levinthal, & Ocasio, 2012). Second, attention is limited: only a limited set of elements can enter into consciousness at a given time, due to bounded rationality (Ocasio, 1997; Simon, 1947). Third, due to their bounded rationality, individuals do not have complete information on possible solutions for the problems they face (Gavetti et al., 2012). That is, information is not readily available: it needs to be searched, which requires resources such as time, money, and attention. Given this, failure to achieve a satisfactory outcome triggers a search process which is thus problemistic in nature (Gavetti et al., 2012). Fourth, when faced with uncertainty, for instance on strategic decisions (Mintzberg, Raisinghani, & Théorêt, 1976), behavior is rule-based. That is, individuals use simple rules to guide their behavior. Search in the vicinity of a problem for its solution is one such rule (Cyert & March, 1992; Gavetti et al., 2012). Fifth, the organization consists of a coalition of groups, each with its own distinct goals and interests (Cyert & March, 1992). These groups can be legally part of the organization, e.g. managers, but also external parties, such as suppliers, are considered to be part of the coalition (Cyert & March, 1992). The roles of these different groups in the coalition are emphasized in the different essays of this dissertation.

A behavioral approach is taken in this dissertation for multiple reasons. First, it has an excellent fit with the studied research settings. From preliminary qualitative inquiries, it became apparent that the decision-making processes were similarly structured as detailed in Cyert and March (1992). This is all the more important since I study public organizations and the assumptions of the strategic management perspective should reflect the empirical setting. The fundamental assumptions of BTOF resonated closely with the actual behavior of the individuals involved. Second, one of the prime functions of BTOF is to explain search and change, the core questions I attempt to answer (Cyert & March, 1992; Gavetti et al., 2012). Since BTOF focuses on how decisions are actually made, this theoretical perspective is all the more relevant when studying which decisions are made in organizations. Fourth, this allows for a contribution to "a behavioral theory of the interfirm" as called for by Gavetti et al. (2012) and

Baum and Ingram (2002).

The organizational change literature rooted in behavioral theory consists of various streams upon which this dissertation builds. I characterize them based on the source of change, specified as the organizational level at which change originates. First, there is a stream that studies the role of the middle manager in stimulating and implementing change (e.g. Wooldridge & Floyd, 1990). Middle managers are particularly important to study as they serve as linking pins between otherwise disconnected groups of organizational members, including operational staff and top managers as well as some external parties (Floyd & Wooldridge, 1999; Huy, 2002). As such, they have knowledge of the day-to-day activities of the organization and have unique access to top management. Operational knowledge helps middle managers to notice needs and issues for organizational change and the access to top management enables the middle managers to voice them (Wooldridge & Floyd, 1990). Thus, middle managers can champion change and also serve as implementers of organizational change (Floyd & Wooldridge, 1992). As such, they are an important constituency to take into account when studying organizational change.

Second, another stream focuses on the role of top managers and board members in orchestrating change (Hambrick & Mason, 1984). It is the role of management to define the "developments and events which have the potential to influence the organization's current or future strategy" (Dutton & Duncan, 1987: 280), which includes the decision to change the organization. The composition of the top management team and board of directors plays an important role, as the type and variety of cognitive perspectives shape the interaction within the group that results in the decision to change (Wiersema & Bantel, 1992). Therefore, these top managers and board directors are also an important constituency to study when examining why, when and which organizational changes are adopted.

Third, other organizations may stimulate the focal organization to change. The literature on diffusion of innovations, in particular, examines which organizations are more likely to

adopt changes (Rogers, 2003). The key assumption is that decision-makers make the decision to adopt based on their own private information and with public cues of whether others also adopt (Greve & Seidel, 2015). A considerable body of literature has found that the more the focal organization is exposed to information on an innovation, the higher its tendency to adopt the innovation gets (Burns & Wholey, 1993; Davis, 1991; Greve, 1996; Haunschild, 1993; Palmer, Jennings, & Zhou, 1993; Westphal, Gulati, & Shortell, 1997). The main argument is that as the number of adopting firms connected to the focal firm increases, the focal firm receives an increasing quantity of social information or influence, which subsequently increases its changes of adopting that same practice (Abrahamson & Rosenkopf, 1997; Haunschild, 1993; Kraatz, 1998). Furthermore, this literature has sought to uncover which types of firms are more likely to be relevant in influencing the focal firm to adopt an innovation. In sum, when considering organizational change, it is thus important to consider the interorganizational environment in which the organization is active (Martin, Swaminathan, & Mitchell, 1998).

Between them, these three levels help build an integral picture of the motivations, timing, and type of changes which a population of organizations engages in. In this dissertation, I aim to contribute to each of these streams and focus on one influence source per essay.[1] Depending upon the level of analysis, I draw more specifically on mechanisms from, or related with, classical behavioral decision theory (Cyert & March, 1992). One such theoretical element is the notion of internal and external reference points, whereby an organization's reactions depend on its performance relative to expectations. A related mechanism is that of organizational learning (Levitt & March, 1988), which again may have an internal source but is also a function of external information (vicarious learning). However, at the more micro level (inside the firm), I draw more on literature that is behavioral in nature but also borrows from other perspectives. As a whole, going from intra- to inter-organizational sources, the

[1] I also recognize that the levels are ultimately interdependent, in particular where top managers are responsible for the actual decision to change, even if change was initiated and may be implemented by middle managers, and top managers also have to integrate external cues about other organizations.

dissertation provides insight into why, when, and which organizational changes are adopted by organizations.

Specifically, the four essays which constitute the main body of the dissertation consider respectively: (1) what tactics middle managers use to convince top management to undertake business model change initiatives, (2) how board diversity impacts strategic decision-making and how that in turn affects the ability of the organization to change, (3) how the attention of the decision-makers and attainment discrepancy jointly shape what kind of organizational change decisions are made, and (4) how partners and indirect (joint-supplier) competitors influence adoption of a new organizational practice. Each essay examines a different type of practices that are changed, but they generally deal with firm boundaries and innovation. The outcomes for the respective essays are changes in: (1) business model, (2) general innovativeness, (3) governance mode of particular activities, and (4) distribution method. Collectively, the essays provide diverse insights into organizational change with the same underlying theoretical assumptions, yet each essay also stands on its own.

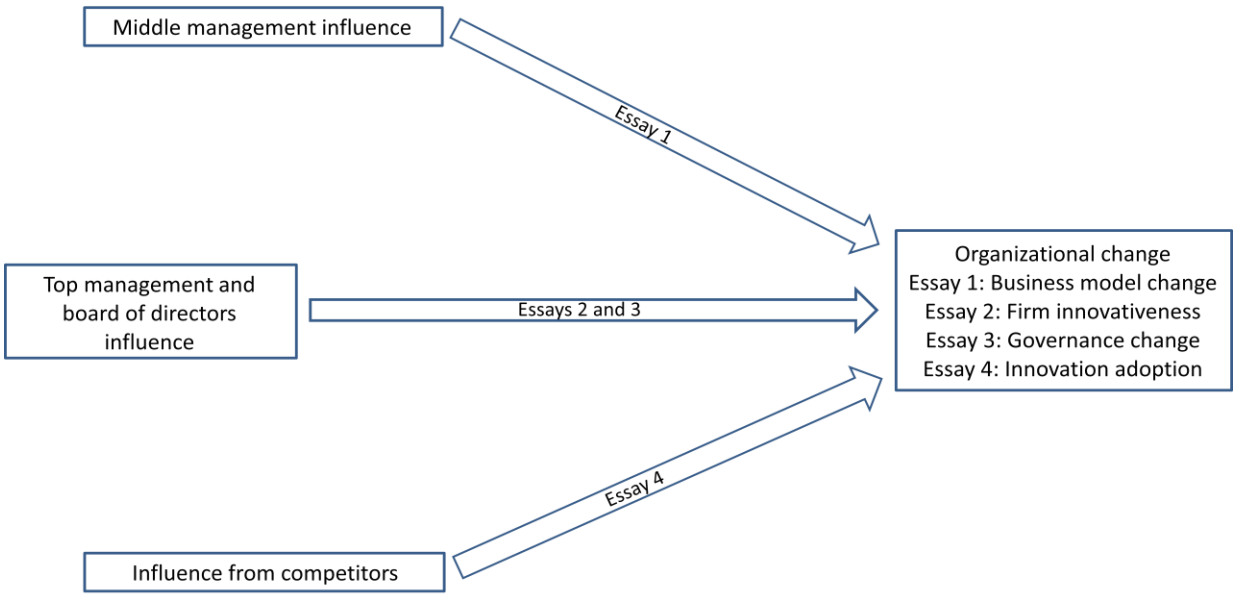

Figure 1: Groups in the organizational coalition studied in each essay

Figure 1 depicts the relationship between the four essays. As the figure illustrates, I study various sources of influences for organizational change, ranging from middle managers, to the top decision-makers, up to external constituencies. Each essay contributes to the various streams in the organizational change literature, primarily from a behavioral perspective.

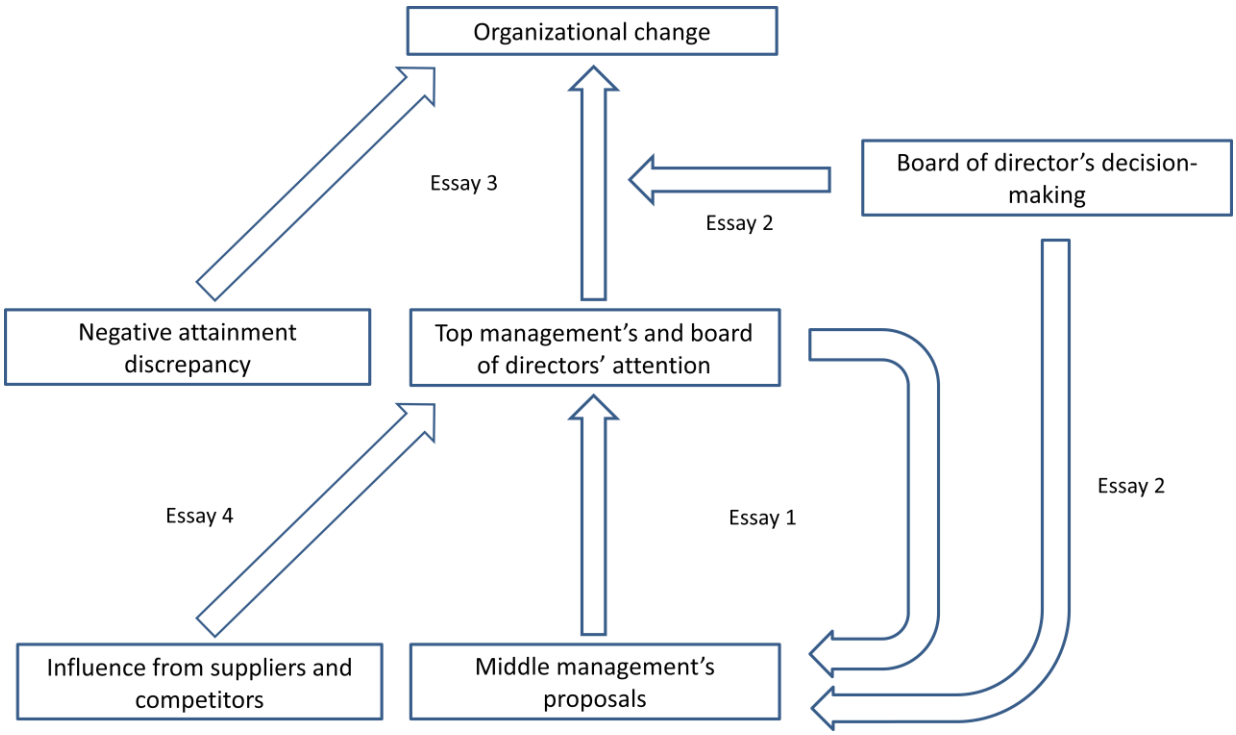

Figure 2: Structure of the dissertation

Additionally, Figure 2 depicts the relationship between the four essays. Although the constructs may not be studied explicitly in the essays, it allows for an integral picture of organization change as it occurs at the studied organizations. Essay one shows the influence of middle management proposals on top management and board of directors, predominantly on what comes to their attention in their meetings. This essay also shows that middle management, through continuous informing top management, will shape its proposals so that they fit with the top management's and board of directors' attention. This resonates with Ocasio's (1997) inertial view on organizational attention. The second essay focuses on board of directors'

decision-making, whether this is political or not. Implicitly, the essay shows that the use of politics influences the decision-making that is driven by top management and board of directors' attention, which in turn affects the decisions that are made in the organization. The third essay is on the top management and board of directors level and shows that their attention and negative attainment discrepancy jointly determine when and what kind of organizational change decisions are made. Last, the fourth essay shows that the organization's suppliers and competitors provide information, to which the top management and board of directors can pay attention to, which ultimately drives the organizational change decision.

Empirical settings

The first three essays are studies of the Dutch water authority sector. In essence, these organizations (also sometimes known as water boards) are responsible for managing water barriers, for maintaining the level and quality of water in waterways, and for sewage treatment in their respective regions. Managing the water barriers and waterways has historically been among their most important activities, given the Netherlands' vulnerable geography, where much of the land area is below sea level. Consistent with the Netherlands' particular vulnerability to flooding and its population density, water authorities have been in existence since the twelfth century, and constitute one of the oldest forms of local authority in the country, having been vested in the Dutch constitution since 1848. Given its geographic situation, the Netherlands requires permanent and intensive public water management.

The Netherlands has developed a complicated system of drainage ditches, canals and pumping stations to keep its low-lying areas dry for habitation and agriculture. The water authorities are tasked with managing and maintaining these critical systems, and also with pumping water into the hinterland to support agricultural irrigation: thus the nation's waterways also serve as irrigation mechanisms. Over time, the water authorities also became responsible for water sanitation, i.e. purifying local water of enough household waste, industrial

pollutants and agricultural runoff that it can be pumped into rivers.

By 2016, there were 22 water authorities in the Netherlands. A fundamental attribute of these organizations is that their top management is chosen via public election every four years. Another fundamental attribute is that they are empowered to levy their own taxes: so they represent a separate public governance level, alongside the Dutch national government, province, and municipality administrations. However, unlike those bodies, they are not considered to be general government authorities, but rather as functional bodies whose remit is limited to public water management. Water authorities have their own 'trade association' - the Association of Regional Water Authorities (also known as 'Dutch Water Authorities') - which discusses industry-wide problems and opportunities with the national government.

Note that these water authorities differ from water utilities. Water utilities provide drinking water services to residential, commercial, and industrial sectors of the economy; in contrast, water authorities are not providers of water to households and firms - that is the responsibility of separate water utilities - but keep waterways in the hinterland at levels such that agriculture can pump water out of them for irrigation purposes at no cost to farmers. In addition, the water authorities' sanitation responsibilities only involve removing waste and pollutants from wastewater so that it is of sufficient quality to be pumped into rivers. The water utilities downstream can then pump the water into their own treatment plants and purify it so that it can be used by households and firms.

Although water authorities are public organizations, their governance is quite similar to that of business firms. Each has a board of directors of approximately 25 individuals (the exact number depends on the size of the water authority) who are elected for four year terms and meet approximately every two months. Of these directors, five typically also make up the top management team which meets approximately every two weeks. The chair of the top management team is appointed by the Crown (the national government), typically for six years. The decision-making process is structured so that the top management team first decides on an

issue at hand and then (depending on the issue's importance) the board of directors makes the final call. If the decision is relatively minor, the board will not be involved at all.[2] The Water Authorities Act of 1991 determines that the prime task of the board of directors is to make sure that the tasks of the water authority are appropriately executed by monitoring top management and setting rules for the strategy or policy to be designed by top management. They are also required to approve other items, such as the budget, tax rates, and the annual report.

There are four categories of directors in the board of directors: (1) inhabitants, (2) firm owners (excluding agricultural firms), (3) agricultural firms, and (4) nature representatives. Representatives of the inhabitants are selected through a voting process by all inhabitants of the region in which the water authority operates. Representatives of firm owners are selected by the chamber of commerce. Representatives of agricultural firms are selected by the employer's organization for the agriculture industry, the Dutch Federation of Agriculture and Horticulture. Representatives of nature are selected by the Dutch Forest and Nature reserve owners association. The province in which the water authority is located decides on the number of seats that each category has in the board of the directors.

Although the directors are all responsible for the appropriate execution of the water authority's tasks, directors' opinions on how this should be done may vary. In particular, their role as representative for a certain category may influence this. For instance, a representative from agriculture will more likely seek to secure funds for projects that benefits local farmers. After their term, a more successful representative is more likely to be selected again (or voted in again); which is one of the prime individual goals of the directors.

In the water authorities we study, middle managers are intermediate-level managers, i.e., they are neither members of the Board or the top management team, but nor are they

[2] The Water Authorities Act (1991) prescribes that top management should prepare all the matters that must be considered or decided upon in the board of directors. Although a number of these matters are mentioned explicitly in the Act (e.g., determining the budget), the Water Authorities Act (1991) does not specify what exactly these matters are. The Act does prescribe that the board of directors should monitor the executed policy and strategy of top management. Hence, top management does need to put forward to the board of directors those matters that allow the board of directors to monitor top management.

employees without supervisory responsibilities. We define middle managers as "managers who operate at the intermediate level of the corporate hierarchy" (Dutton & Ashford, 1993: 398). They are the civil servants with supervisory responsibilities. They are the prime sources of innovation projects designed for organizational change, which they propose to top management for approval. If the change project necessitates a substantial amount of resources, the board of directors has the ultimate say in the decision-making process. Hence, the middle managers are the sources for organizational change, whereas the top managers and directors are the decision-makers for organizational change.

Since every water authority is tasked with water management in its own region, water authorities do not face competition. As a population of organizations, they can only be dismantled by the national government. Even then, their existential right is vested in the constitution, thus dismantling these organizations would require a change in the constitution with all the onerous procedures involved. Indeed, this would involve the dismantling of *all* water authorities: A single water authority cannot be dismantled. Nevertheless, the province in which the water authority is located, can decide on a merger between water authorities. Poorly performing water authorities can in such a way be merged into more successful ones.

Although poor performance of these organizations may have less severe consequence than for other types of organizations, such as firms that can go bankrupt, the decision-makers are incentivized to ensure good performance. First, as previously mentioned, they are required by law to make sure the organization executes its tasks properly. Second, the performance of a water authority is frequently and publicly benchmarked with that of others. Being a decision-maker of a relatively poorly performing organization is thus not in the personal interest of the directors and top managers. This effect is exacerbated by the fact that directors serve a four year term, after which they are subject to election or re-nomination for the next term. Poorly performing boards are thus likely to be selected out.

In total, the intricacies of this setting are substantial. There are important advantages of

using this setting, however. First, the composition and size of the board of directors is determined exogenously. Second, by their public nature, these organizations allow for the comprehensive data collection on the minutes of all their board of director meetings. In addition, although confidential, the minutes of top management team meetings have also been collected. Third, the water authorities have specific and restricted governance mode options when it comes to organizing or reorganizing activities. Thus, it allows for a more structured and cleaner theorization and analysis of this phenomenon (in chapter 4).

A disadvantage of using this setting pertains to the generalizability of the findings. Specifically, this setting diverges from more traditional research settings in strategy research, such as publicly listed firms, in the specific categories of stakeholders, the tasks of the board of directors and possibly the inherent politicality of the decision-making process. As such, the findings require replication. In each essay I discuss this issue in more detail.

Although water authorities offer an interesting context to study intra-organizational processes and collaboration with peer organizations, their status makes them less relevant for studying the diversity of external influences on change. In the last, more externally oriented essay, I study a different industry with greater visibility of direct and indirect ties: the global video game industry (2006-2013). Traditionally, video game publishers have sold products through independent retail stores. With the introduction of the seventh generation video game consoles (Playstation 3, Xbox360 and Wii), digital distribution channels became available. This provides a relevant context for studying the spread and adoption of change in distribution methods.

Methodologies

Throughout this dissertation, I employ different research methods as they befit the research questions of the respective essays. Given the process-oriented question in the first essay, I employ a qualitative approach. I start with the collection and analysis of archival sources to

gain a thorough, multi-facetted understanding of the case's technical and organizational intricacies (Yin, 2009). Getting acquainted with the subject via archival information is a fruitful way to prepare the researcher for the interview stage, especially in retrospective cases. Moreover, archival documents can give the researcher a specific indication of the process, which can then be leveraged in the interviews (Yin, 2009). The fact that our archival sources reported precisely who was involved in each document and meeting also informed my selection of interviewees.

For essays two and three, I draw upon a unique collected set of archival documents: all minutes of board of directors meetings in 2008-2014 (in essay three I also use the confidential minutes of top management meetings in 2008-2014). The analysis differs between the two essays given the constructs that are studied. In the second essay, I study a dimension of decision-making, which can be captured by using word counts analysis as a proper dictionary can be constructed that covers the construct to be studied. For the third essay, I use topic modeling since for the construct of interest, attention, it is much more difficult to create an appropriate dictionary, thus making word count analysis inferior. Topic modeling is also more applicable in this essay as the overall change in the use of words reflects a change in attention (Duriau, Reger, & Pfarrer, 2007). Hence, attention can and should be captured by considering the full text, not just the use of certain words as specified in a dictionary.

Computer-aided text analyses hold important advantages and disadvantages. Foremost, it is a more reliable and cost-effective method compared to human-coded techniques. Human-coded techniques also assume that the substance of topics and the rules of coding documents are known a priori (Quinn, Monroe, Colaresi, Crespin, & Radev, 2010). One advantage of human-coded techniques is that the coding scheme of text in documents can be highly sophisticated and contingent, increasing the validity of the study. Yet, especially when considering a large set of documents, the use of multiple coders becomes necessary, making it difficult to track whether (1) the same rules are used by the coders and (2) the coders use

adequate rules to capture the constructs to be studied. Hence, provided we as researchers are also boundedly rational, human-coded techniques may be superior when the amount of text to be studied is low, but computer-aided text analyses become superior as the amount of text increases. Another strength is that content analysis allows for rendering the rich meaning of organizational documents (qualitative data) coupled with quantitative analysis (Duriau et al., 2007).

Last, for the fourth essay, I created a more traditional secondary dataset, which I analyze through event history methods.

Intended contributions

The first essay (chapter two) – *Business model change: Managerial roles and tactics in decision-making* – considers the decision-making process behind business model change, focusing specifically on the tactics middle managers employ to gain support for such changes. I aim to extend and refine the body of evidence about how business model changes gain acceptance in large organizations, and thus help explicate a process that is notoriously difficult to accomplish. The case study shows that, to promote a business model change initiative, middle managers leverage external agreements made by the organization, and keep top management continuously informed about the progress of the business model change initiative. Although recent research has begun to uncover the stages of business model change on one hand, and the various roles and considerations involved on the other, I explicate how a change initiative can proceed towards acceptance, i.e. what are the mechanisms that ensure that a business model change initiative is ultimately accepted.

This paper seeks to extend and in some ways modify one stream of literature that focuses on middle management roles in strategic and general management, and another stream pertaining to issue selling and initiative championing. I propose that middle management plays a specific role in identifying business model change opportunities and in initiating such

changes. My findings shed new light on the manner in which this role can be played, in particular by contrast with the landmark work of Burgelman (1983b). Moreover, the tactics I uncover extend those found in previous research on issue selling and championing, and provide some original contrasts with extant work, that may inform future research in that area.

I also examine conceptually how business model change differs from other types of organizational change. I theorize that such differences include economic impact, the number of parties involved, and the complexity of the interactions between these components. Although my case evidence does not allow for the empirical verification of these premises (or of their absence: Cuypers & Martin, 2010), I believe my conceptual contribution can inform future empirical research that may contrast business model and other organizational changes more fruitfully along specific dimensions.

The second essay (chapter three) – *Clear blue water: The mediating role of politics in the board diversity-organizational innovativeness relationship* – seeks to extend the literature on board diversity by explicitly studying the mechanism by which board diversity affects firm innovativeness. I introduce a novel concept, stakeholder diversity, and show that it influences how decisions are made and whether conflict is resolved politically in the board of directors' decision-making process. Diversity itself does not directly influence innovativeness, but does so indirectly by increasing the amount of politics in the board of directors' decision-making process.

For decision-making research, I aim to show how politics in decision-making can have far-reaching implications for an organization. I attempt to demonstrate that political decision-making not only affects the organization's financial performance, but also its innovativeness. I also seek to demonstrate that board diversity is an important precursor to the relationship as more diversity makes the board of directors' decision-making process more political. For the innovation literature, I aim to show that political decision-making is an important indicator for the innovativeness of the organization.

The third essay (chapter four) – *Being in deep water: Negative attainment discrepancy, organizational attention, and interorganizational relationship formation in the Dutch water authority sector* – synthesizes the attention-based view with the behavioral theory of the firm to show that organizational attention shapes *which* type of decision is more likely to be made in response to negative attainment discrepancy. I aim to contribute to expanding and operationalizing the attention-based view, and to linking with behavior decision theory. I also demonstrate that topic modeling can be used to measure broader categories of attention that other textual methods cannot do justice to. I also aim to contribute to the behavioral theory of the firm; I aim for a theoretical contribution in identifying the boundary conditions under which negative attainment discrepancy influences decisions, specifically the decision to engage in an interorganizational relationship (IOR). Last, the IOR literature is increasingly exploring behavioral determinants (e.g. Tyler & Caner, 2016). I contribute to this field by showing that a synthesis of attention-based and behavioral theories can shed original light on IOR formation.

The fourth essay (chapter five) – *"In this world, it's copy or be pasted": The role of suppliers in innovation adoption* – aims to extend the innovation adoption literature by studying the role of different actors in the innovation adoption process. I theorize that firms are more likely to adopt an innovation when their competitors have adopted that innovation, but that this is more than a simple matter of serving the same role in an industry. I distinguish between (1) competitors with which the focal firm has a direct business relationship (direct competitors) and (2) competitors with which the focal firm has an indirect relationship through a mutual supplier (joint-supplier competitors). In so doing, I uncover the role of firms that cannot adopt the innovation in question, e.g. suppliers, but share information on the innovation between firms. These intermediaries serve as cross-pollinators of the innovation. It is paramount to include these actors in study of the adoption process, although they may not be the adoption subjects.

Furthermore, I start to uncover which suppliers have greater influence in the focal

firm's decision to adopt the innovation. Earlier innovation adoption research has showed that the adoption of certain types of firms, such as large and prestigious firms, make the focal firm more likely to imitate adoption of the innovation (Burns & Wholey, 1993; Haunschild & Miner, 1997). I argue that those social approval assets make the supplier more persuasive in its sharing of information on the innovation.

Third, by building on the work on outcome-based imitation, I aim to show that continued adoption of the same innovation by the same reference firm produces a strong influence for the focal firm to also adopt. Hence, not only the decision to adopt, but also the extent of adoption is important to explain adoption processes.

As a whole, the dissertation advances our understanding of why, when, and which organizational changes are adopted. I also hope that this dissertation will *inspire* new research on organizational change so that someday, we will be able to grasp the complex behavior of humankind as they are active in organizations.

Chapter 2[3]

Business model change: Managerial roles and tactics in decision-making

Abstract

We study the decision-making process behind business model change, focusing specifically on the tactics managers employ to gain support for such changes. We first argue for the prominent role of middle management in business model change, and second, we revisit the literatures on issue selling and championing as they may apply to business model change decision-making. We subsequently analyze the case of a business model change initiative in the Dutch water authority sector, revealing two specific tactics that middle management employed to obtain top management's agreement to business model change: leveraging external agreements and continuously informing top management. We discuss how these findings extend and in some ways suggest a rethink of the literature on organizational change. Finally, we describe the specificities of business model change that distinguish it from other types of change. In sum, this article demonstrates the interest of research at the nexus of business models and organizational change.

[3] This chapter is the result of joint work with Xavier Martin. It appeared in 2015 in *Advances in Strategic Management*, 32: 387-420.

Introduction

A growing stream of literature over the last ten years has examined the business model concept. Researchers have arrived at powerful conceptualizations in which business models "provide a set of generic level descriptors of how a firm organizes itself to create and distribute value in a profitable manner" (Baden-Fuller & Morgan, 2010: 157) and "describe the design or architecture of the value creation, delivery, and capture mechanisms [the organization] employs" (Teece, 2010: 172). Although more attention is being paid to how business models evolve over time, very little research has addressed the problems of changing from one business model to another, even though this is known to be a critical transition that affects firm survival (Tripsas & Gavetti, 2000).

In this paper, we tackle this gap by examining the 'who' and the 'how' of business model change decisions. Our research question is: *'What are the main tactics employed by managers to gain acceptance for a business model change initiative*?' Specifically, we study *managerial roles* and *tactics* in the *decision-making processes* involved in business model change. We study these processes from the stage where decision-makers pay attention to a potential change, all the way through to the point where top management decides to launch a revised business model. We pay special attention to the tactics that middle managers employ to ensure that the business model change initiative progresses. Through a case study, we discover two tactics that - to our knowledge - have not hitherto been identified as such, or described in the literature, that enable middle managers to buffer and promote business model change. Thus, we explicate conditions for business model change at the decision-making process level of analysis. Subsequently, to inform future comparative research, we explore conceptually how the conditions for business model change may differ from those for other types of organizational change.

The intended contributions of our study are several. First, we aim to extend and refine

the body of evidence about how business model changes gain acceptance in large organizations, and thus help explicate a process that is notoriously difficult to accomplish. Our case evidence shows that, to promote a business model change initiative, middle managers leverage external agreements made by the organization, and keep top management continuously informed about the progress of the business model change initiative. Although recent research has begun to uncover the stages of business model change on one hand, and the various roles and considerations involved on the other, we contribute to this literature by explicating *how* a change initiative can proceed towards acceptance, i.e. what are the mechanisms that ensure that a business model change initiative is ultimately accepted.

Second, we aim to contribute to the literature on organizational change. Our research extends and in some ways modifies one stream of literature that focuses on middle management roles in strategic and general management, and another stream pertaining to issue selling and initiative championing. We propose that middle management need to play a specific role in identifying business model change opportunities and in initiating such changes. Our findings shed new light on the manner in which this role can be played, in particular by contrast with the landmark work of Burgelman (1983b). Moreover, we explicate the tactics middle managers employ to convince top managers to agree to business model change, which enable them to overcome top management's reluctance, and which are thus essential to the execution of business model change. The tactics we uncover extend those found in previous research on issue selling and championing, and provide some original contrasts with extant work, that may inform future research in that area.

Third, we examine conceptually how business model change differs from other types of organizational change. We theorize that such differences include economic impact, the number of parties involved, and the complexity of the interactions between these components. Although our case evidence does not allow for the empirical verification of these premises (or of their absence: Cuypers & Martin, 2006a; Cuypers & Martin, 2006b), we believe our conceptual

contribution can inform future empirical research that may contrast business model and other organizational changes more fruitfully along specific dimensions.

Conceptual development

Managerial roles

Given their different positions in the firm, top management and middle management may differ in how they recognize and respond to opportunities for organizational change. Middle management is closer to the organization's day-to-day activities, so will naturally pay attention to opportunities that involve inter-unit interactions and relationships with buyers, suppliers and other partners. Some middle managers are especially close to the firm's current and potential customers, which enables them to make vital inputs into business model change (Baden-Fuller & Haefliger, 2013; Baden-Fuller & Mangematin, 2013). Meanwhile, top management's role is to set the organization's overall goals and allocate its resources, so it naturally attends to higher-level strategy rather than to specific business model interfaces or partners. Our analysis of published articles on organizational change (see below) corroborates our premise of middle management's prominent role in business model change.[4]

Burgelman's case studies (Burgelman, 1983a, b, 1991, 1994) focused on the changes in some of the firm's core activities. We argue that these changes encompassed a change in its business model (among other things), although Burgelman did not employ that term as it was not in use at the time. Specifically, Burgelman (1983b) studied how managers decided how to produce a new product and to whom to sell it - elements of value creation and capture at the firm's boundaries that are part of the business model as it is now understood (Amit & Zott, 2001; Baden-Fuller & Morgan, 2010; Teece, 2010). Burgelman (1983b) showed that the initiators of change were middle managers, who first and foremost paid attention to the

[4] Note that we focus here on studies of larger organizations. The following argumentation may differ as a matter of degree for smaller companies, where managerial roles may be less distinct. We return to this briefly in the discussion section.

potential value of a specific opportunity and how to unlock that value. It was these business-level managers - not top management - who observed the commercial opportunities for a new activity. The key position in the opportunity recognition process turned out to be that of group leader in the R&D department, i.e. someone who held a first-line supervisory position (Burgelman, 1983b). This process required that middle managers convince top managers to commit resources to capitalize on the opportunity: making them aware of the opportunity and its potential was a key step in the change process.

Chesbrough and Rosenbloom (2002) and Tripsas and Gavetti (2000) reported similar patterns. In their case studies - of Xerox and Polaroid respectively - they showed how middle managers were the main driving forces and instigators of the business model changes that would be required to make new technologies profitable, as they could see the need for a different business model to unlock their value. Consistent with these findings, Khanagha, Volberda, and Oshri (2014) found that middle managers in a large telecommunications firm saw the need to shift to cloud computing, and were able to convey the importance of this opportunity to top management. Thus, we can see that middle management has a special role to play in business model changes, and that the success or failure of such changes may hinge on their ability to convince top management. However, what is lacking in this literature is a focus on the potentially critical process issue of *how* middle management is able to convince top management to agree to business model change. However, two allied literature streams - to which we turn next - may be relevant here, as they address processes of organizational change in general.

Issue selling and championing

Since myriad initiatives vie simultaneously for top management's support (Lovas & Ghoshal, 2000), middle managers need to employ various tactics throughout the decision-making process to convince top management to pursue their proposed initiative. We define the actions that middle management undertakes to gain support for their initiatives during the decision-

making process as ‘decision-directing tactics’.

We turn next to literature streams on issue selling and championing that examine the dimensions and mechanisms of change decision processes. The literature on issue selling shows that individuals outside top management teams can shape an organization’s actions by directing top management’s attention to particular issues, which may either be opportunities or problems (Dutton, Ashford, O'Neill, & Lawrence, 2001; Dutton, Ashford, O'Neill, Hayes, & Wierba, 1997; Dutton & Jackson, 1987). Issue selling is defined as “the process by which individuals affect others’ attention to and understanding of the events, developments, and trends that have implications for organizational performance” (Dutton et al., 2001: 716). Issue selling “shapes the direction and rate of strategic adaptation at the firm level by affecting the content of an organization’s ... agenda” (Dutton et al., 1997: 408). By prompting top management to pay attention to specific matters, issue selling centers on and plays a critical role in the first stage of the decision-making process, i.e. the identification of issues that may lead to organizational change (Dutton & Ashford, 1993; Dutton et al., 1997), but does not extend to study how middle management can offer and advance solutions to these issues, and so shape the contents of the responses.

Meanwhile the literature on championing focuses specifically on how middle management can propose solutions to certain issues to top management (Floyd & Wooldridge, 1992), and so how the latter can be prompted to support the initiatives that middle managers propose. This championing of alternatives has been defined as the “persistent and persuasive communication of strategic options to top management” (Floyd & Wooldridge, 1992: 155). The main differences between issue selling and championing lie in the nature of what is proposed to top management and the stages at which it is proposed. Issue sellers push abstract issues or ideas, whereas champions typically push concrete solutions towards fruition (Ashford, Rothbard, Piderit, & Dutton, 1998): thus both may ultimately be relevant to business model change.

These literatures have revealed various kinds of decision-directing tactics, which can be grouped into four basic choices (Dutton & Ashford, 1993). The first is *packaging*, which refers to the way an initiative is framed or presented (Andersson & Bateman, 2000; Dutton & Ashford, 1993; Dutton et al., 2001; Sonenshein, 2006). The second is *channels*, which refers to whether the initiative is advanced in public (such as weekly staff meetings) or in private (Dutton & Ashford, 1993; Dutton et al., 2001). The third choice is *involvement*, which concerns whether to conduct the issue selling and/or championing individually or to get others involved (Dutton & Ashford, 1993; Ginsberg & Abrahamson, 1991). The fourth choice is the level of *formality*, such as giving official presentations to top management or pushing initiatives informally around the coffee machine (Dutton & Ashford, 1993). Both issue selling and championing literatures have contributed potential tactics or mechanisms, albeit with different emphases across the four choices. Table 1 summarizes the decision-directing tactics so far identified in these literature streams.

Table 1 Summary of decision-directing tactics in the literature

Choices of decision-directing tactics	Issue selling literature	Championing literature
Packaging	Highlight financial implications	Frame the issue as a financial opportunity
	Present an issue as incremental change	Acquire a large depth of information on the
	Present issue succinctly	Present an issue as simple
	Continuous proposal making	Use metaphorical language to champion the
	Tie issues to the profitability goal	Frame an issue as urgent
	Tie issues to market-related issues	
	Tie issues to the concerns of key	
	Tie issues to other issues	
Selling channels	Use public channels	
Involvement	Coalition building	Use of external agents
Formality	Formality of issue selling	

An important limitation of these past studies concerns the nature of the issue and initiatives that are studied empirically, which typically revolve around the incremental improvement of specific organizational operations. Dutton et al. (2001) focused on various

operational issues in a hospital context, such as the need for an in-house mini-laundry, requests for an increase in the dialysis budget, and consolidation of registration systems; Piderit and Ashford (2003), Dutton, Ashford, Lawrence, and Miner-Rubino (2002), and Ashford et al. (1998) focused on speaking up about the treatment of women in organizations; and Howard-Grenville (2007) studied environmental issues associated with the production of microprocessors. Other studies have administered questionnaires to understand the process of selling issues in hypothetical situations (Dutton et al., 1997; Sonenshein, 2006), or have been conceptual, not taking the nature of the issue into account (Dutton & Ashford, 1993; Dutton & Jackson, 1987; Ling, Floyd, & Baldridge, 2005). To our knowledge, the issue selling and championing literatures have not considered cases of business model change. Thus, although Burgelman (1983b) has shown that middle management may play an important role in change situations that encompass business model change, evidence is lacking about the processes middle managers might use to convince top management to agree to business model change.

This conclusion points to the need for exploratory work to study the decision-directing tactics employed in business model change initiatives. We turn next to this task, with a qualitative focus on discovering decision-directing tactics that may not have been identified as such in previous research. In this next section, our overall research question remains the same, but we address it empirically as: " *What are the main tactics that managers employ to gain acceptance for a business model change initiative* ?"

Decision-directing tactics for business model change: A case study

Inductive work is appropriate to identifying decision-directing tactics in business model changes. As became apparent from our conceptual development, existing theory cannot give a specific answer to the research question. Moreover, because decision-directing is a complex social process that is not easily inferred from general quantitative data, studying this issue

inductively is especially appropriate (Eisenhardt & Graebner, 2007). As could be expected from the literature, in the case we study, we found that business model change was instigated by middle management.

Research Setting

We selected the case of a regional water authority in the Netherlands. In essence, these organizations (also sometimes known as water boards) are responsible for managing water barriers, for maintaining the level and quality of water in waterways, and for sewage treatment in their respective regions. Managing the water barriers and waterways has historically been among their most important activities, given the Netherlands' vulnerable geography, where much of the land area is below sea level. Consistent with the Netherlands' particular vulnerability to flooding and its population density, water authorities have been in existence since the twelfth century, and constitute one of the oldest forms of local authority in the country, having been vested in the Dutch constitution since 1848. Given its geographic situation, the Netherlands requires permanent and intensive public water management.

The Netherlands has developed a complicated system of drainage ditches, canals and pumping stations to keep its low-lying areas dry for habitation and agriculture. The water authorities are tasked with managing and maintaining these critical systems, and also with pumping water into the hinterland to support agricultural irrigation: thus the nation's waterways also serve as irrigation mechanisms. Over time, the water authorities also became responsible for water sanitation, i.e. purifying local water of enough household waste, industrial pollutants and agricultural runoff that it can be pumped into rivers.

By 2015, there were 24 water authorities in the Netherlands. A fundamental attribute of these organizations is that their top management is chosen via public election every four years. Another fundamental attribute is that they are empowered to levy their own taxes: so they represent a separate public governance level, alongside the Dutch national government, province, and municipality administrations. However, unlike those bodies, they are not

considered to be general government authorities, but rather as functional bodies whose remit is limited to public water management. Water authorities have their own 'trade association' - the Association of Regional Water Authorities (also known as 'Dutch Water Authorities') - which discusses industry-wide problems and opportunities with the national government.

Note that these water authorities differ from water utilities as commonly found in other countries. Water utilities provide drinking water services to residential, commercial, and industrial sectors of the economy: in contrast, water authorities are not providers of water to households and firms - that is the responsibility of separate water utilities - but keep waterways in the hinterland at levels such that agriculture can pump water out of them for irrigation purposes at no cost to farmers. In addition, the water authorities' sanitation responsibilities only involve removing waste and pollutants from wastewater so that it is of sufficient quality to be pumped into rivers. The water utilities downstream can then pump the water into their own treatment plants and purify it so that it can be used by households and firms.

As noted above, water authorities have seen their responsibilities change over time, albeit over a scale of decades and centuries. More recently, they have begun to think about how else they might be able to create value for society. A number of reasons have been advanced for such changes, such as image building, responding to ongoing existential threats from national politicians keen to concentrate power, and fiscal limits. This impetus has led to various initiatives to reconfigure how water authorities create and share value, one of which we study in the case described below.

Although water authorities are public organizations, their governance is quite similar to that of business firms. Each has a board of directors of approximately 25 individuals (the exact number depends on the size of the water authority) who are elected for four year terms and meet approximately every two months. Of these directors, five typically also make up the top management team which meets approximately every two weeks. The chair of the top management team is appointed by the Crown (the national government), typically for six years.

The decision-making process is structured so that the top management team first decides on an issue at hand and then (depending on its importance) the Board of directors makes the final call. If the decision is relatively minor, the Board will not be involved at all. In the case we study in this paper, the top management team was involved at the end of each decision-making stage, whereas the Board was involved in the final decision as to whether or not to implement the business model change, as befits important decisions.

We defined middle managers earlier as "managers who operate at the intermediate level of the corporate hierarchy" (Dutton & Ashford, 1993: 398). In the authority we study, middle managers are intermediate-level managers, i.e., they are neither members of the Board or the top management team, but nor are they employees without supervisory responsibilities.

Case description

Our case study examines the decision-directing tactics that middle managers employed to propel one business model change initiative from one stage to the next, where stages indicate increasing top management commitment and the end-goal is to convince the Board to give this initiative the final 'go ahead' towards full-scale operational implementation. The primary unit of analysis is the decision-making process. We consider the case from the point where middle managers recognized an opportunity (or threat) up to the point where the Board decided to implement the changed business model. Thus our analysis encompasses the whole decision-making process (Mintzberg et al., 1976). We deem the decision to change the business model to be complete once the Board explicitly agrees to implement the business model change and allocates financial resources to do so at full operational scale, which constitutes the end boundary of the case. The full-scale implementation of the business model change is thus not part of the case - but all the intermediate steps leading up to this decision are.

The case we select is a project we call 'ELEC' at 'Water Authority Y' (both pseudonyms), in which this water authority considers whether to generate electricity from the waste it collects at its water treatment plants. Pursuing this initiative meant that the

organization would change how it created, distributed (delivered) and captured value, by engaging in the generation of electricity - aside from its responsibilities for maintaining water levels and quality - and delivering this electricity directly to industrial users. From a business model standpoint, the source of value generation would change based on a novel form of value generation (Zott & Amit, 2007). Monetizing this activity would also be altogether different: the electricity would be sold on a unit basis to firms near the water treatment plants, whereas the authority's current activities are monetized by levying broad taxes on the region. In addition, the proposed change would modify the organization's core mission. So the change would appear very complex, and likely to generate uncertainty and hesitancy among top managers and Board members. As an instance of organizational change, the case has some structural similarities to Burgelman's (1983b) study of a large diversified firm implementing a new activity. However, our analysis deals precisely with the business model change, and our study also departs from Burgelman (1983b) in focusing on the decision-making process, and specifically on the decision-directing tactics employed by middle management.

Data sources

We collected data from two main sources: archival documents and semi-structured retrospective interviews.

Archival documents. We analyzed an exceptionally comprehensive set of formal administrative documents relating to top management decisions. These were drafted by middle management, asking formally for decisions (e.g. extra resources, permission to proceed to the next stage) and including memos - typically one to five pages long - and other reports and documents, plus larger sets of technical and decision reports. Each document contained details of who was involved in writing and shaping the text, and to whom it was addressed and for what purpose. We obtained them based on Water Authority Y's reporting obligations as a government entity. We also had access to agendas and notes of all related meetings of top managers (and, eventually, of the Board).

These documents were supplemented by internal notes, strategic planning documents, presentations, press reports and e-mails: all were precisely dated, which allowed us to develop a comprehensive timeline. A typical problem with using archival sources is biased selectivity and access, which results in incomplete evidence (Yin, 2009). However, we were given access to the organization's ERP system in which all of these documents were stored, reducing the possibility that valuable archival documents were missed, as we were not reliant on an interviewee to provide them. We also asked management for any other kind of archival sources that might have not been stored in the organization's IT system, to ensure extra comprehensiveness.

Table 2 reports the type and number of archival documents that we found most relevant for this study. Consistent with our research question, this includes the main documents providing information about the *process* of influencing and making decisions about ELEC. We identified 73 such documents issued over the four and a half years during which the idea unfolded and the decision was made. Measured per year, the number and diversity of the internal documents we were able to exploit compares well with those of a strategy study that used the same mix of methods (Crossan & Berdrow, 2003). The table excludes documents of less importance for our research question - such as mentions of ELEC alongside other projects (though we used such documents as relevant, e.g. to identify the timeline) - and documents (e.g. press releases) that merely described the outcome rather than the decision process. We verified over 200 other documents mentioning ELEC or related issues (e.g. an agreement with the national government to which we refer below), and iterated between reviews of documents, interviews, and our analyses to ensure it was comprehensive. Many of the documents listed in Table 2 were addressed to top management or shed light on how middle management dealt with top management, which is consistent with our premise that middle management played a key role in the process of pushing the ELEC proposal up the decision ladder towards acceptance.

Table 2 Main archival documents analyzed

Type of document (number of documents)	Publication dates
Proposals: Proposals typically consist of a short summary about the initiative at hand, an agenda of the meeting at which the proposal is to be discussed, information about who wrote the document and the top managers who are expected to respond. We also matched the response of top management to each proposal. (12 documents)	2009-2013
Presentations, reports and other supporting documents: These documents contain in-depth information, and mostly extend a letter or proposal. (18 documents)	2008-2013
Minutes of middle management meetings: These are short notes of meetings where middle management discussed the progress of the ELEC project and prepared for meetings with top management. (9 documents)	2008-2013
Emails/letters: These are communications to and from middle management that contain information about the issue and decision at hand. (34 documents)	2008-2013

One drawback of using archival documents as a primary data source is that written documents do not necessarily contain the unmitigated truth (though of course, nor may other sources). Each document was written for a specific purpose and audience - their authors may have had different interests, so that for some purposes archival documents alone do not fully report on what is being studied (Yin, 2009).However, for our research question, using internal documents as a primary source is actually a strength of the research design, since we aim specifically to study how authors framed their reports to direct the Authority's decision about the initiative. Many documents were written in preparation for discussions between middle and top management, so they are integral written communications, rather than the retrospective and potentially filtered summaries of communications and decisions to which some studies are limited - although we also obtained and exploited minutes and other ex-post decision reports. Finally (as detailed below) we also conducted interviews that allowed us to verify some of the documents. The combination of archival documents and interviews allow for making exceptionally strong and robust inferences from case studies (Yin, 2009).

Interviews. We interviewed multiple managers at Water Authority Y, as well as industry representatives such as experts from the Association of Regional Water Authorities. Our interviews revealed that one middle manager of Water Authority Y was extensively involved in

the entire decision-making process and was extremely knowledgeable about the case. We interviewed this manager for multiple hours over several conversations, corroborating the fact that he was a key informant (Yin, 2009). We also found no other employee who was as extensively involved in the ELEC decision process: nevertheless, we held extensive interviews with two respondents in related positions, as well as with general managers, and their responses confirmed those of our key informant. Although including respondents who were only marginally involved may raise threats to internal validity if their responses cannot be cross-checked - because response errors are likely to be higher for such informants (Kumar, Stern, & Anderson, 1993) – in our case their supplementary responses helped ensure the completeness and validity of our fieldwork.

To avoid retrospective bias, we triangulated the information obtained from our interviews by cross-checking our interview transcripts against archival documents. Each interview lasted between one and two and a half hours, all were taped and transcribed *verbatim*, and the transcriptions sent back to the interviewees to check the validity of their contents: all were approved. As part of our agreement with Water Authority Y for this study, we went back to the interviewees after writing the initial draft of this paper so they could provide feedback, and to ensure the validity of the results. The respondents agreed emphatically with our descriptions of the mechanisms and tactics employed by middle management as described below. We also presented our findings to top management, who likewise concurred.

Research approach

Our research approach differs from traditional ethnographic research in that we started by collecting and analyzing archival documents before conducting in-depth interviews. Using archival documents as primary or initial data sources is an accepted methodology for qualitative research in general (Yin, 2009), but it is seldom used in strategic management research (see Crossan & Berdrow, 2003). Instead, documents are used for triangulation purposes after interviews have been conducted in most management studies, or otherwise play

a secondary role. Thus, our approach deserves elaboration.

We started with archival sources, including some descriptive and external documents not listed in Table 2 but discussed above, to gain a thorough, multi-facetted understanding of the case's technical and organizational intricacies (Yin, 2009). Performing the primary analyses based on archival data is a fruitful way to prepare the researcher for the interview stage, especially in retrospective cases. Moreover, archival documents can give the researcher a specific indication of the process, which can then be leveraged in the interviews (Yin, 2009): in this case the documents hinted at certain decision-directing tactics that were used in the decision-making process. The fact that our archival sources reported precisely who was involved in each document and meeting also informed our selection of interviewees.

The extensiveness of the documentation made available to us allowed us to construct a detailed timeline of the decision-making process and identify the points of interest for this study, by analyzing when documents reported a conversation between middle management, when top management needed to make a decision about the project, and when the activities in the decision-making process changed significantly (e.g. from identifying the opportunity to developing a way to capitalize on it). Constructing a timeline based on the documents is a valuable way of reducing recall bias: in this case, it was especially important as the sequence of events we studied began approximately 5 years before the detailed fieldwork was undertaken, although we were in contact with the organization before the decision process was completed. Furthermore, the timeline, along with the highlighted points of interest, provided a solid basis for our interviews,[5] which revealed the decision-directing tactics in detail. Graphical representations - such as an annotated timeline - are "particularly useful for understanding process data as they allow for the simultaneous representation of multiple dimensions, and can

[5] Initially we obtained unassisted recall from our interviewees, which allowed for data triangulation, and we could subsequently go through the timeline with an interviewee to discuss relevant points of interest. In some instances, the interviewees actively recalled events when seeing the documents and timeline, or we were able to use the timeline to achieve clarifications from the interviewees. This illustrates a further advantage of our methodology over exploratory ethnography.

be used to show precedence, parallel processes, and the passage of time" (Langley, 1999: 700).

Data analysis

Our analysis process consisted of three steps: data reduction, data display, and iteratively drawing and verifying conclusions. The data reduction consisted of categorizing and coding the relevant data we collected. We started reducing the data by constructing the timeline and developing tentative categories of decision-directing tactics. For example, the steady stream of documents and communications about the ELEC project middle managers sent to top managers suggested what we refer to below as the 'continuous informing tactic'. The timeline and preliminary categorization of archival data guided our interview protocol.

As the interviews added to our raw data, we revised our timeline and constructed a narrative of the case (on which we report in the next section). The narrative, cross-referenced to the reduced data and iteratively triangulated against raw data as it came up, gave us a broad view of the Authority's decision-making process about the ELEC idea, and ultimately identified the specific decision-directing tactics that middle managers used to convince top management to agree to the whole initiative.

Keeping both our research question and the broad literature on issue selling and championing in mind, we began coding the interviews while simultaneously returning to the archival documents to uncover decision-directing tactics and understand their logic. Although guided by the literature, we remained open to new decision-directing tactics. We took excerpts of interviews about middle management's tactics to convince top management specifically into account, which allowed us to uncover additional decision-directing tactics and update the tentative categories we distilled from the archival documents. Table 3 shows these main findings, describing how and where each new tactic was uncovered.[6] Our findings were

[6] The table features two essential tactics that were not described in the literature reviewed above. We also observed tactics previously described in the issue-selling literature, such as highlighting financial implications, presenting the issue succinctly, or tying the initiative to market-related issues; however, those tactics were less salient in archival documents in this case, and interviewees described them as less important. We take this both as indicating that our research design was robust, and as suggesting that there may be something different about business model

subsequently verified with the interviewees, and we presented a preliminary version of this paper to middle and top management to determine if we had interpreted the data correctly. The attendees agreed with our interpretation and codification of the data, as well as with the conclusions we formed.

Table 3 Summary of novel decision-directing tactics found at ELEC

Source/*Tactic*	Tactic inferred from	Example
Archival documents		
Leveraging external agreements	Explicit mention of an agreement between the focal organization and outside constituencies that stipulates an organizational target	Proposal mentioning that ELEC could be used to meet an energy target, and including a copy of an agreement with the national government that specifies this target for the water authorities
Continuously informing top management	Number and nature of contact points between middle and top management	Proposal mentioning that middle management aims to inform top management regularly about the status of ELEC
Interviews		
Leveraging external agreements	Quoting or mentioning an agreement between the focal organization and outside constituencies that stipulates an organizational target	"So if you let top management sign such an agreement, you [can then] get their support if you want to initiate a project like ELEC."
Continuously informing top management	Quotes about the importance of maintaining ongoing contact between middle and top management	"We speak monthly with [the top manager] where we discuss the main points [of the initiative]." "[Top management] informally gets to know about the recent developments, but we also do it formally by composing a [report]." "So if [the top manager] does not want to go in a certain direction, you know that you shouldn't develop the initiative in that way." "[The top manager] is informed about the matter, but does not have to make a decision."

change. We turn to this last conceptual point at the end of the paper.

Summary of the narrative and findings of the ELEC case

We identified different stages in the decision-making process as the background to our findings. The first stage was the identification stage, where middle management discovered the opportunity to generate and sell electricity from materials collected at their wastewater treatment plants, while they were looking for ways to reduce energy costs and waste. However, it was an external event that ensured that recognition of this opportunity built and eventually spread from middle management to top management.

This external event was a contest organized by the Association of Regional Water Authorities in which the authorities were invited to submit ideas to modernize the public face of water authorities, which had been plagued by a 'dusty' public image that threatened the legitimacy of the organizational form itself. One of the ways suggested to improve their image was to create and implement innovative projects that would increase their public visibility. ELEC was such a project, as it was argued that the Authority would become more visible if it were to sell electricity directly to other organizations or even to households. At the contest, four water authorities presented similar proposals: to make their wastewater treatment plants energy neutral and, in the long run, to become energy providers.

Days after the contest, these four water authorities met to discuss the need to engage in preliminary research to ascertain the feasibility of their ideas, and created a tentative consortium to share in this effort. This marked a critical transition in the decision-making process, from opportunity recognition to increasingly sophisticated analysis. Water Authority Y decided to commit a small sum of money for preliminary - mainly desk - research, most of which was carried out by water authority employees, although three consultancy companies were hired to handle some of it. Within half a year, it became clear that the general idea was technically and financially feasible, but more extensive research would be needed before top management could decide whether to implement ELEC.

Top management support was required to ensure the transition to the development stage, as Water Authority Y would need to invest more money in research. At this point, a separate agreement made earlier by top management with the national government proved instrumental in helping middle management to persuade top managers to pursue the ELEC project further. This 'Multi-year agreement on energy efficiency' included a public undertaking by all water authorities' top managements (via the Association of Regional Water Authorities) to increase energy efficiency by 2% per year. The final agreement stated that this goal could be achieved through any combination of efficiency gains in processes or supply chains, and the use of renewable energy. The last point turned out to be critical, as the ELEC concept could contribute directly towards this element. As one interviewee put it:

> *The 2% [target] was not a motive to invest in the ELEC project, but it facilitated the progress of this project. [...] We could go to top management and say, "Well, have a look, Water Authority Y agreed to this and this back then, it would really help if we implement this ELEC project."*

The next stage included research on the exact location where the ELEC project could be realized, in-depth research about its technical details, and finding potential partners to buy the energy surplus generated. Water Authority Y also hired an external consultant to draft a comprehensive technical and business case to help with this effort. Consistent with previous research (Mintzberg et al., 1976), this development stage took up the vast bulk of the decision-making process. Especially during this period, which included relatively long stretches between development milestones, middle management made concerted efforts to inform top management regularly about the progress, both orally and in writing.

First, a middle manager undertook to talk to his senior counterpart regularly to maintain the project's visibility: importantly, this was done routinely, as a matter of course, even if no particular news or decision was required. Middle managers also sought to use these discussions

to proactively ascertain top managers' preferences, so as to orient the ELEC project towards their way of thinking:

> *We speak monthly with [the top manager whose portfolio concerns wastewater treatment] where we discuss the main points [of the project].*
>
> *We do so to keep [top management] informed on the initiatives, so [they] know what is in the pipeline. [,..][The relevant top manager] is informed about the matter, but does not have to make a decision.*
>
> *It is an informal meeting where I hear in what direction [the top manager] wants to go. So, if [the top manager] does not want to go in a certain direction, you know that you shouldn't develop the initiative in that way.*

Second, middle management effectively made sure that top management as a whole received and acknowledged written information about the project at least once every three or four months - again, even when there was no breakthrough progress or major conclusions to report. This is all the more remarkable as we found no evidence that top management requested regular reports (or that such reporting was culturally ingrained); rather, middle management initiated these communications proactively in the ELEC case.

The middle managers referred to the communications thus created as a 'continuous' rather than a 'constant' informing process: one with sufficient frequency, regularity and bilateral 'bandwidth' that ensured ELEC stayed in top managers' minds. This long-lasting effort also ensured that no gaps or discrepancies in understanding were left unnoticed by middle management, and that top management could be confronted with the technical and business case directly once it was complete:

> *Top management is informed and then we get the final report of the consultant, and then the next steps become very tangible. The final report concludes what we can do and where we can do it. This is where we got out of the [development]*

stage and then we are looking at the best way to implement this ELEC project. We are not yet going to implement it [on a large scale], but we are going to investigate how to implement it and then we draft a list of smaller projects which we can pursue towards the ELEC project.

One interviewee elaborated on why continuously informing top management was very important in directing their support for the ELEC initiative:

Well, if you have a project that is not supported by a top manager, if there is no top manager who is willing to defend the initiative in front of the whole top management team, it becomes very difficult. To some extent, that top manager needs to become the owner of that initiative.

At the completion of the development phase, the ELEC project was split into three smaller 'sub-projects' that were separate but complementary. Middle managers evaluated each sub-project and the feasibility of their implementation. Following the completion of this development stage, middle management put all three sub-projects forward to top management at the same time, each necessitating its own decision. This signaled the beginning of the short final selection stage. In April 2013, top management decided to implement all three subprojects - and thus the ELEC project as a whole - so completing the decision-making process for this case. Full-scale implementation of ELEC was then begun.

Discussion

Although much attention has been paid to business model change or innovation, in fact little research has examined the *who* and the *how* of business model change. Specifically, we set out to discover what tactics managers use to gain acceptance for a business model change initiative. Our review of the literatures on middle management roles and on issue selling and championing showed that, although this research sheds lights on the roles and tactics used to

effect organizational change, research that specifically examines business model change from these process perspectives has been lacking. Accordingly, we focused specifically on the decision-directing tactics used in a case of business model change. The case study of the ELEC project unearthed specific tactics that middle managers used to direct top management towards supporting the business model change initiative, and thus to advance the decision-making process from stage to stage. Two tactics were especially important.

For one thing, middle management used an existing external agreement to gain support from top management. Specifically, they linked the ELEC project with an agreement previously made by top management relating to improving energy efficiency. This compact differed from typical managerial policies and commitments in that it was a sector-wide agreement with a powerful external party (the government) that basically specified a goal for the organization, but left it with flexibility as to how it should be attained. The agreement was meant to secure support and legitimacy from external stakeholders, so we refer to it - and others like it made by top management - as an external agreement. Middle management deliberately leveraged this external agreement to gain support for the ELEC project. We argue that, by leveraging such existing external agreements (and possibly by advocating them in the first place), middle management can gain top management support to propel related projects through the decision-making process.

Our fieldwork suggests some mechanisms by which leveraging external agreements helps propel related projects forward. The fact that top management agreed to the goals stipulated in the external agreement created an expectation, by association, that it would attend to any initiative that promised to further their attainment. Although that expectation does not guarantee the initiative will be supported (Cyert & March, 1992), it makes it much more likely that it will at least be acknowledged and properly examined (Bower, 1986) – as certainly happened with ELEC. Such mindful treatment, in turn, makes it more likely that a project related to the agreement will be accepted, and also that - when accepted - the project can be

expected to be generously supported and to succeed (Bower, 1986; Ghosh, Martin, Pennings, & Wezel, 2014). It is therefore up to middle management to show that their initiative furthers the attainment of such superordinate goals. As mentioned above, one interviewee conveyed just that impression. Furthermore, that middle manager suggested that, if top management were not favorably inclined, it would need to provide a better reason to reject an initiative linked with an existing external agreement. This type of mindful attention may be especially relevant when initiatives are perceived as high-risk and complex to analyze, as business model changes generally are (something to which we return in the next section). This helps explain why we observed this mechanism as being prominent in the ELEC case, although it has not previously been described in the issue selling literature.

There may be an exacerbating factor related to the context and type of external agreement. In this sector, external agreements are normally between individual water authorities and the national government (or between the whole industry and the national government, as described above), i.e. they bind the organization to the highest government authority. While the energy efficiency agreement (and other similar agreements, such as one to lower overall costs and thus the burden on taxpayers) was meant to increase the legitimacy of the water authorities, it compelled them to come up with projects to increase the effectiveness of their activities lest they lose both funding and political support. The middle managers promoting ELEC understood this well, and thus specifically sought to leverage this external agreement. Indeed, one interviewee mentioned that it would be smart in future to encourage external agreements based on initiatives related to ones they wished or intended to pursue.

In summary, we expect the effectiveness of the tactic of leveraging an external agreement to be a function of the strength of that agreement, and of its 'fit' with the intended new initiative. We recognize - as did the interviewees - that this combination was unexpectedly strong in the ELEC case: nevertheless, more generally, our finding about the role of external agreements contributes to the middle management perspective in strategic decision-making,

and offers a new mechanism via which middle management can gain support for its initiatives. In effect, the strength of the external agreement elevates the power of the middle managers working on an associated initiative. Although the external agreement that propelled the ELEC project may have been unusually formal and visible, because it involved the national government, we believe that similar external commitments can also be identified in other contexts - such as in CEOs' statements in annual reports (Chatterjee & Hambrick, 2007), in other corporate and marketing communications, in alliances that require extensive and durable collaboration (Cuypers & Martin, 2007; Krishnan, Martin, & Noorderhaven, 2006), or in industry-wide self-regulation initiatives (King & Lenox, 2000).

The issue selling literature has described a looser yet potentially powerful class of tactics labeled as *packaging*, referring to the way an issue is framed or presented linguistically and visually (Dutton & Ashford, 1993). Such research has shown that tying the issue being sold to broad organizational goals helps issue sellers gain support (Dutton et al., 2001). These goals do not necessarily have to be explicit, e.g. goals may be to increase revenues or to enhance patient care, without specifying the desired extent of such increase or enhancement (Dutton et al., 2001); and are typically internal, rather than externally agreed and communicated. The ELEC case departs from this in several important ways. First, the agreement was precise and quantified as to its end goals, if not its means; second, the agreement was with a powerful external party; and third, the agreement was highly public. We surmise that, although not common, such conditions make for exceptionally strong packaging of an initiative, as may be required for business model change. Thus, we extend the issue selling literature by uncovering an especially powerful tactic: tying the issue to a broader organizational goal that is explicitly formulated, that commits the organization to a powerful external party, and that is highly visible. Future research may yet explain when it is necessary to leverage such strong agreements, but our analysis clarifies and extends considerably the range of elements (here, agreements) with which an issue may be packaged.

A related argument in the championing literature is that having knowledge of the organization's internal and external contexts helps champions gain support for their issue from top management (Andersson & Bateman, 2000). Through careful preparation, they can gain access to data to develop meaningful and positive presentations of given issues to make to top management (Andersson & Bateman, 2000). The ELEC case shows that champions can indeed capitalize on superior information, but also elaborates on one way in which they can do so. By specifically understanding the prior commitments top managements have made externally and publicly, champions can direct decisions in such a way that top management will have to support initiatives or risk being labeled inconsistent in their behavior. If top management wants to retain the trust of middle management (and others), and their authority over them, they need at least to be consistent in their claims about goals and means. Such agreements bind top management, and so may empower middle managers in ways the championing literature has not fully elucidated. Because championing is primarily an internally oriented activity, aimed at harnessing the organization's resources, future research may yet elaborate the respective effects of the 'external' and 'public' factors - acknowledging that the two tend to be related, but that an agreement with an external partner may not be known to the general public - and reveal under which conditions such agreements may be most effectively leveraged. Although in our case the exogenous nature of the external agreement is unambiguous, such research could also consider under what conditions middle management may advocate general agreements in anticipation of specific organizational changes that may go against top management's existing preferences; and conversely under what conditions such agreements may be signed strategically by top management with a view to binding themselves - and their entire organizations - in a credible fashion (see Postrel, 1991).

The second decision-directing tactic middle managers employed involved continuously *informing* top management about the proposed change, which entailed the provision of regular,

substantive reports to top management, both formally and informally and via both oral and written channels. Middle management also used this mechanism to develop its own awareness of top management's preferences as they evolved. Continuous informing also kept top management's attention on the project, and so prepared them for an eventual - hopefully positive - decision.

Although the literature has previously reported continuous *proposal making* (Dutton et al., 2001), the mechanism whereby this tactic relates to effective issue selling remains unclear, as is the distinction between adding information about a given project and repeating the same proposal. The ELEC case helps clarify and in some ways modify our understanding of this mechanism. We find that continuous informing helps maintain top management's attention and primes them for eventual decisions,[7] and also helps middle management to identify top management's preferences, and to refine their initiative to align it with the latter's concerns as they evolve. Moreover, it may help overcome top managers' cognitive biases (Kaplan, Murray, & Henderson, 2003), ensuring that they get used to the idea of change and can gradually come to accept it, without reverting to defensive or inert positions (Tripsas, 2009). As awareness of the new model becomes more ingrained, expectations of further information and milestones also become axiomatic to top management. We argue that continuous informing plays an essential role in cases of business model change - such as ELEC - because the systemic and complex change involved requires the steady shaping of top managers' minds.

Dutton et al. (2001) found that the early involvement of top management and continuous proposal making helped issue sellers gain their support. They argued that this was because issue sellers rarely had the chance to present all their proposals at once, and so instead brought issues forward one at a time. In our case, this middle management behavior is not a consequence of the information context - indeed the project was presented as a whole from the start, and only later broken down into pieces (which would then be reassembled). Rather,

[7] This part of the mechanism parallels a result reported in Dutton et al. (2001).

continuous information provision (and seeking) was a deliberate tactic middle managers used to ease the transitions between the stages; that is, the continuous effort was intentional. Further, our timeline shows that continuous informing took place even when they were no substantive new issues to be put forward.

Our finding differs in another specific from those of Dutton et al. (2001): We do not find that middle management continuously 'pushed' their initiative in the sense of promoting it, but rather that they informed top management of events as they happened throughout the initiative's stages. We found their written communications about ELEC were heavy on information, but virtually devoid of forceful subjective opinions, as were the oral communications according to interviewees. In our context, the research stages did the 'pushing', because their end-points provided compelling and agreed-on bodies of evidence, which resolved major elements of uncertainty in what was a complex project. Indeed, once the decision-making process went into its later, solution development, stage, middle management no longer needed to 'sell' the project per se; rather, they aimed to keep top management objectively informed about research results. (Of course, this would work better if the research consistently supported the initiative's viability.) Again, we surmise that this is especially relevant for business model change. Future research may uncover to what extent continuous informing works for various initiatives, especially those that require harnessing complex information.

Our findings about leveraging external agreements and continuously informing top management also extend - and to some extent modify - the literature on managerial roles in change initiatives. Specifically, Burgelman (1983b) found that middle managers who had identified opportunities for new activities generally needed to develop awareness about the promise of these new activities without revealing their plans prematurely. So they were forced to scavenge for resources and conduct their tests and analyses covertly, and even sought to generate evidence of market interest to demonstrate the feasibility of the new activity. This was

consistent with the favorable view of "skunk works" around the same period (Kidder, 1981); but this view might have become somewhat outdated, given the growing intensity of corporate information and control systems and the tightening of organizational slack under global competition (Bartlett & Ghoshal, 1998; Martin, 2014). In our case, middle managers were more open to top management from the onset, and used more visible decision-directing tactics. Rather than developing the activity covertly, the middle managers in this case actively sought to link the initiative with an external agreement with the national government - that is, they raised the internal visibility of the project effectively by linking it with a publicly-made external commitment. This was also manifested when an early version of the proposal was presented at an open contest organized by the Association of Regional Water Authorities, as described above. Moreover, openness was a necessary condition from the outset for middle managers to be able to inform top management continuously, and to adjust the project based on their responses. Importantly, leveraging a public agreement and continuous informing were complementary tactics that reinforced each other to keep the idea of business model change alive in top managers' minds during the project's relatively long gestation. As such, our findings represent an alternative configuration to the covert resource and communication pathway that Burgelman (1983b) described. Future research may examine under what conditions covert vs. overt pathways of middle management influence are the more effective.[8]

Of course, our findings also inform the business model literature. Although recent advances have begun examining the process of business model change and its various stages, we know relatively little about how such processes progress from stage to stage. For instance, Khanagha et al. (2014), found that middle managers could convey a business model change opportunity to top management, but *how* they did so remained unclear. Similarly, other studies

[8] Note also that Water Authority Y's middle management was much more resource-constrained than that described in the Burgelman (1983b) case. Different constraints on middle management may lead to different decision-directing tactics. Although our case study is not sufficient to tease out this difference, this is another relevant avenue for future research.

found that sensing new business models is critical to engaging in business model innovation, but have remained silent about *how* top managers become aware of these opportunities, let alone come to support them (Achtenhagen, Melin, & Naldi, 2013; Aspara, Lamberg, Laukia, & Tikkanen, 2013; Mezger, 2014; Miller, McAdam, & McAdam, 2014). Our paper extends and redirects this research in several ways.

Conceptually, we argue that middle managers are well positioned to recognize and seize opportunities for business model change or innovation, but also that they can then drive the process of deciding in favor of the change. Empirically, we elucidate that middle managers attempt to direct top management's business model change decisions by leveraging external agreements and by continuously informing them about the progress of research on initiatives. We thus advance a view of business model change and innovation as a longitudinal decision-making process, within which specific mechanisms and roles can be studied in depth. This view integrates what have been disparate pieces of understanding of the stages and sense-making dimensions of business model change and innovation, and the roles of top and middle managements. Rather than the recent emphasis on top management and individual leadership (see also Sosna, Trevinyo-Rodríguez, & Velamuri, 2010; Svejenova, Planellas, & Vives, 2010), we develop a perspective that sees business model change as a middle-up sense-making process that proceeds via the continuous provision of information. Furthermore, as opposed to an internal or otherwise market-oriented foci of attention, our findings link the business model with other goals and constituencies (such as the external energy efficiency agreement). The use of both tactics contrasts in particular with the narrower (and eventually stalled) process that Tripsas and Gavetti (2000) describe to explain the failure of business model change at Kodak. Finally, the novelty of our findings relative to the extant organizational change literature (described above) suggests that the tactics and other processes involved in business model change may differ in structural ways from those involved in other types of organizational change - something that we return to in our penultimate section.

Our methodological approach, starting with archival documents and then generating further inferences via interviews, is also worth discussing. It is not unprecedented, even in strategic management (Crossan & Berdrow, 2003) – but it is not typical in organizational change research, where most issue selling research follows a classical ethnographic approach starting with and primarily based on interviews (e.g. Dutton et al., 2001; Howard-Grenville, 2007; Piderit & Ashford, 2003). But archival documents can be especially valuable as a primary data source for research on change decision-making for three reasons. First, evidently, the contents of the documents may be used to uncover different tactics. Specifically, accessing the original documents used as inputs into decisions (as opposed to just minutes or ex post reports) provides a direct window into how managers framed the decision. Our paper demonstrates this approach; using fieldwork, only extensive participant observation could match this level of detail. Second, the frequency and type of documents may provide evidence for a certain type of tactics, as it did in this study. Third, the very choice of language used in writing such documents may be an issue selling tactic in itself (Sonenshein, 2006). When studying the framing and selling of change initiatives, any biases discovered when examining archival documents can actually inform the research. In addition, despite their many strengths, interviews by themselves may invoke not only recall but also rationalization biases arising from interviewees' beliefs about who directed the decision.

Of course, archival and interview sources can be complementary (as in our research, and many other studies). Overall, we conclude that an approach starting with in-depth analysis of the archival documents that served as inputs into decisions is suited to the study of organizational change decisions. Furthermore, this is all the more so when the decisions under study unfold over long periods and challenge traditional managerial roles, two conditions that exacerbate the risk of bias in retrospective interviews. We believe that this definitely applies to decisions about business model changes, among others, but further comparative research would be required to confirm under what conditions our research approach is preferable to

conventional interview-led techniques for studying decision-making about organizational change.

Although external validity is an issue with every case study, it is worth noting the intricacies of the setting and whether the findings are generalizable to other settings. On the one hand, the role of middle management as sources for organizational change is quite similar to that found in more traditional research settings, as in firms (Wooldridge & Floyd, 1990). On the other hand, the role of top management in this setting is more restricted to approving and deciding on organizational change, rather than being the source of change itself. This is more unique to these organizations compared to regular firms. Hence, it may be easier for middle managers to bring initiatives to the attention of top management in our case study, since these initiatives do not compete as strongly with the ideas of top management as they would in firms. Nevertheless, we deem this difference to be a matter of degree, not kind.

As for the transferability of the tactics to other settings, external agreements are likely to be less pervasive in other settings, or at least less salient, than in the more political water authority setting. However, this may still be a viable tactic in other settings as well, provided these agreements exist. One caveat is that the top managers and directors of a water authority are, by virtue of being elected, more politicians than water managers. As such, they may be especially mindful of these external agreements and complying with them than managers would. Continuously informing top management will likely be more difficult in other settings as top managers do not only decide on, but are also a source for organizational change. Still, this may also be a valuable tactic in other settings, if middle managers have the opportunity to use it. Nevertheless, to conclude about the external validity of this essay, replication in a more traditional setting is warranted.

Business model change vs. other organizational change

We now turn in detail to one final issue - how business model change, as we have studied it above, may differ from other types of organizational change.

In principle, we see three main ways in which business model changes may differ from 'ordinary' organizational changes. First, business model changes stand to be more *fundamental* in economic terms than most other types of changes. That is, changing the business model unsettles a whole series of elements within and across the firm's external boundaries that are foundational to its economic logic, which follows plainly from the fact that business models pertain to the very logic of how organizations create, deliver, and capture value (Amit & Zott, 2001; Baden-Fuller & Morgan, 2010; Teece, 2010). Thus, a change in an organization's business model transforms both its core activities and its critical interfaces, such as those with suppliers and partners (Zott & Amit, 2010). Accordingly the success or failure of business model change can deeply affect the firm's profitability (Zott & Amit, 2007), and even its very survival (Tripsas & Gavetti, 2000). This contrasts with the type of relatively narrow, operational issues that we found described in previous issue selling literature, even when purported financial benefits were part of the issue packaging.[9] Theoretically, one may imagine other types of change that are also fundamental in economic terms, though there are few. They may include some instances of strategy change by which the firm thoroughly modifies its scope and competitive approach (Hofer & Schendel, 1978; Martin, 2013; Martin, Mitchell, & Swaminathan, 1994; Martin & Van den Oever, 2013), which would make a particularly interesting comparison with business model change. Nevertheless, we argue that business model change is economically more fundamental than ' ordinary' organizational change,

[9] Recall that Dutton et al.'s (2001: 716) classical definition of issue selling refers to "events, developments, and trends that have implications for organizational performance". This treatment does not presume that the performance implications are particularly substantive; indeed, they may even be exaggerated as part of a packaging tactic. Meanwhile, as reviewed above, most of the issues described in the issue selling and championing literatures may have been important to a specific constituency, but were not as fundamental in economic terms (in the sense we stated) as business model change would be.

certainly as studied previously in the issue selling and championing literature.

Second, the *number* of critical economic partners involved in the change effort is likely to be greater for business model change than for other types of change, as may their diversity. The business model centers on the focal organization, but transcends it and spans its boundaries to encompass relationships with buyers, suppliers and other economic partners (Zott & Amit, 2010). As a result, business model change involves not only the focal organization, but also the other firms and organizations in its current activity system - plus (possibly wholly different) actors that will be involved in the focal organization's new business model, as stood to happen in our ELEC case. By contrast, the 'ordinary' changes used to develop past issue selling theory, even if they were relatively large in scale, have typically related solely to the focal organization or to a narrow subset of its (current) external partners - such as discussions about the need for more nursing departments in a general hospital (Dutton et al., 2001), or concerns about gender equity (e.g. Piderit & Ashford, 2003).

Third, the *complexity* of the process is likely to be higher in business model change. Complexity increases as the number of a system's components increases, but also with the unpredictability of the interactions between them (Levinthal, 1997; Salomon & Martin, 2008; Simon, 1962). As argued in the preceding paragraph, business models encompass an unusually large number and diversity of organizational elements and interfaces (e.g. a value proposition, revenue model, and distribution channels). In addition, the fact that the business model is a configuration of value creation, delivery, and capture mechanisms ensures that the interactions between these components are harder to comprehend, predict and control, as each change in the configuration creates tradeoffs in a spiral of consequences that reverberate both within the firm and at its boundaries (Martin, 2002; Martin, Swaminathan, & Tihanyi, 2007; Reed & DeFillippi, 1990; Scuricini, 1988). The effectiveness of a business model relies on its systemic consistency (Zott & Amit, 2010), so any adaptation creates a cascade of change among interdependent elements. The unpredictability of business model change is also exacerbated

because it involves external actors, which are legally separate decision-makers with goals and priorities of their own that cannot be resolved by fiat (Martin, 2013; Martin & Salomon, 2002).

Conclusions

Because of these three specificities - fundamental economic impact, number of components involved, and complexity of their interactions - we expect business model change to be one of the most arduous and risky changes an organization can undergo. We argued earlier that middle management plays an essential role in identifying and promoting business model change opportunities. As our case illustrates, the ultimate goal is to obtain top management agreement and support for the change: conversely, if top management denies their support, the drive towards business model change will surely fail (Tripsas & Gavetti, 2000). Hierarchical discrepancy - meaning that those who best understand the business model change may not be those who eventually have to agree to it - compounds the three specificities just discussed. This implies that, from top management's standpoint, the cognitive impediments to understanding and agreeing to change can be expected to be especially high for business model change. Unless they can be reassured about the importance and feasibility of the new business model, top managers are likely to resist the change as hampering their organization's ongoing performance (Amit & Zott, 2001). Moreover, the success of the current business model is likely to influence what information is fed into and filtered out of the decision-making process (Chesbrough & Rosenbloom, 2002), which makes it harder to convey the benefits of business model change, as compared to 'ordinary' changes, and may intensify top management's reluctance to commit to engage in business model change. This reluctance, in turn, makes it both more difficult and more important for middle managers - who we earlier identified as the key actors where business model change is concerned - to gain their superiors' support. For this reason, the two tactics identified in our case study - leveraging existing commitments made by top management and keeping them steadily informed - could serve to buffer and promote the

change initiative in a manner that is critical where business model change is concerned. It remains to be seen how effective such tactics might be for other types of organizational change.

More generally, a comparison with other types of organizational change would require more data than our single case allows, but represents a doubly important opportunity for future research. First, such research would help further enrich current theoretical perspectives, such as the issue selling, championing and middle management literatures, by describing a richer menu of potential solutions and identifying contingencies for their relevance. Secondly, it would increase our understanding of business model innovation, an increasingly important construct in the strategic management field. Again, a comparison with other types of change - perhaps most promisingly, with strategy changes - would be informative. We have identified three dimensions - economic impact, number of parties involved, and the complex interdependencies between them - and an exacerbating factor - the hierarchical discrepancy inherent in a middle-up process - that could inform future research of this type.

Chapter 3

Clear blue water: The mediating role of politics in the board diversity-organizational innovativeness relationship

Abstract

This paper proposes a new type of board diversity, stakeholder diversity—the extent to which different stakeholders are represented on the board—and investigates its effect on organizational innovativeness through politics in board decision-making. Because of differences in interests among stakeholders, we theorize that stakeholder diversity increases the extent of politics in the board-level decision-making process. Subsequently, we argue that political decision-making reduces organizational innovativeness. We test these hypotheses on the population of Dutch water authorities by analyzing minutes of board of director meetings. We indeed find that stakeholder diversity positively affects politics. Moreover, the more political the decision-making in an organization, the less innovative that organization. We conclude by discussing the implications for the literature on board diversity, strategic decision-making, and innovativeness.

Introduction

Although much research has studied corporate boards, there is little consensus on the optimal member diversity in such a board (Johnson, Schnatterly, & Hill, 2013). For instance, age diversity has been associated with higher firm value (Kim & Lim, 2010), gender diversity makes members more likely to voice their concerns and thus to instigate strategic change (Westphal & Bednar, 2005), and occupation diversity inhibits strategic change (Goodstein, Gautam, & Boeker, 1994). Two countervailing mechanisms account for these inconsistent findings. Advocates of diversity claim that diverse teams engage in more task-related conflict, which involves disagreements on the work to be performed (e.g., allocation of resources), as different members possess unique resources, networks, and expertise—but consider more alternatives through such conflicts (Bantel & Jackson, 1989; Janssen, Van de Vliert, & Veenstra, 1999; Triana, Miller, & Trzebiatowski, 2013). Opponents of diversity argue that diverse teams engage in more emotional conflict, which is counterproductive for decision making (Barkema & Shvyrkov, 2007). Conflict thus plays a fundamental role in explaining the effects of diversity.

Given that we need more clarity and tests on the intervening mechanism by which diversity affects outcomes (Johnson et al., 2013; Lawrence, 1997), we introduce in this paper a new type of board diversity that directly caters to the degree of conflict in decision making. In so doing, we aim to generate more detailed insights into how board diversity affects firm outcomes. We conceptualize the organization as a political coalition of members with different goals and interest (Cyert & March, 1992). Viewed from this behavioral lens, we study the degree to which board members differ in their goals and interests by studying the heterogeneity within the board of stakeholder representation. This concept, which we label as stakeholder diversity, will allow us to understand how the political coalitions within the board engage in conflicts and thus how

they affect innovativeness. In this way, we can better understand why certain organizations are more innovative than others, which is important given that innovation can be an important way to retain environmental fit (Miller, 1992). That is, organizations, even public ones, may face their business model going obsolete (Van den Oever & Martin, 2015) and engage in a continuous search for improvement, e.g., in cutting costs. Innovation is key to catering to these demands.

We specifically study whether stakeholder diversity influences the degree of political decision making on the board and how political decision making can in turn affect organizational innovativeness. Such research is important, as the way that organizations decide to allocate resources to innovation projects may affect which initiatives are fed into the decision-making process as well as whether innovative initiatives are selected.

In short, this paper aims to uncover how stakeholder diversity affects the degree to which political decision making is present and how politics influence organizational innovativeness. Formally, our research question is as follows: "*What is the relationship between stakeholder diversity and political decision making, and to what extent do politics influence organizational innovativeness?"* By answering this question, we seek to explain the mechanism by which stakeholder diversity can influence organizational innovativeness.

We study these relationships in the Dutch water authority industry. Dutch water authorities are one of the main expert organizations in the field of water management, and they constitute an excellent arena to study our research question. First, in these organizations, the board of directors makes decisions to engage in an innovation that requires a significant amount of resources; thus, we can adequately apply decision-making measures to study firm innovativeness. Second, since the board of directors decides on the allocation of funds to an innovation project in these organizations, passing through the board of directors' decision-

making process is a necessary precursor for an innovation to arise. Third, these organizations keep detailed minutes of their board of director meetings, making it possible to measure the forms of decision making adequately. Fourth, the boards of these organizations comprise individuals who represent different categories of stakeholders, allowing us to measure diversity differently by going beyond demographic characteristics. Fifth, a common problem for studies on boards of director is that the composition of the board is endogenously determined (Johnson et al., 2013). In our setting, the degree of stakeholder diversity is determined by the province and is thus exogenous.

The tasks of the water authorities' board of directors are similar to those of public firms, yet there are some subtle differences. First, the fundamental role for these directors is to monitor top management and to set rules for the strategy and policy that top management wants to develop. They are also tasked with approving the budget, annual account, and annual report, but they also set tax rates for different stakeholder groups. The directors are expected—but not required by law—to protect the interests of the stakeholders that they represent (which can be inhabitants, business, agriculture firms, and nature). Failing to protect these interests may result in them not being re-elected in the next term. As for innovation projects, the board's involvement is limited to approving the allocation of resources to projects that require substantial resources.[10] Hence, the primary role of the board of directors is to engage in decision control.

This research contributes to the literature on board diversity, decision making, and innovation in multiple ways. For board diversity, we introduce a novel concept, stakeholder diversity, and show that it influences whether conflict is resolved politically in the board of directors' decision-making process. Diversity itself does not directly influence innovativeness, but it does so indirectly by increasing the amount of politics in the board of directors' decision-

[10] What is substantial is not determined by law.

making process. Regarding decision making, we show how politics in decision making can have far-reaching implications for an organization. We demonstrate that political decision making affects organization's not only financial performance but also innovativeness. We also demonstrate that board diversity is an important precursor to the relationship, as more diversity makes the board of directors' decision-making process more political. For the innovation literature, we show that political decision making is an important indicator for organizational innovativeness.

Finally, we offer a methodological contribution by developing a new approach to measure politics and innovativeness. Most studies measure decision-making approaches by using questionnaires, which are less accurate and more obtrusive than directly observing the minutes of meetings in which decisions are made. We develop a dictionary of politics that should facilitate future research.

Conceptual Development

Stakeholder Diversity

The bulk of research on board diversity has examined how demographic characteristics can influence a firm's strategic actions and performance. A key assumption is that demographic characteristics are indicators for an individual's experiences, cognitive styles, values, and skills (Hambrick & Mason, 1984). The more demographically diverse the team, the more diverse the knowledge bases and perspectives that each individual brings to the team (Jehn, Northcraft, & Neale, 1999). Another stream in the board diversity literature focuses specifically on such knowledge bases by examining human capital characteristics, which are the skills and experiences that individual directors bring to the decision-making process (Johnson et al., 2013).

The implications of such demographic and human capital diversity have been difficult to predict. On the one hand, demographic diversity can increase conflict, as the members will have different ideas (Kosnik, 1990). On the other hand, demographic diversity can reduce conflict, as members will be hesitant to voice their concerns owing to a lack of social integration (Westphal & Bednar, 2005). Moreover, increased conflict may be beneficial, as it allows directors to better monitor top managers, yet it may be detrimental for the board's ability to provide resources (Van Ees, Van der Laan, & Postma, 2008). Nonetheless, boards are stronger in their advisory function when their diversity in tenure and industry experience is greater (Tuggle, Schnatterly, & Johnson, 2010). Given that a focus on demographic characteristics has generated contradictory findings and given that such characteristics are weak proxies for the underlying cognitive dimensions of interest (Lawrence, 1997), we focus on a different type of board diversity that is a stronger proxy since it caters more directly to the interests and goals of the board members.

Not only do board members differ in their demographics, past studies have also examined the type of knowledge and contacts that different board members can bring (Baysinger & Butler, 1985; Byrd & Mizruchi, 2005; Hillman, 2005; Hillman, Cannella, & Paetzold, 2000). For instance, having former politicians on the board of directors allows an organization to gain knowledge on the public policy process, a channel of communication to existing politicians, and legitimacy (Hillman, 2005). Bankers can provide expertise in the form of financial or investment advice (Byrd & Mizruchi, 2005). However, bankers will protect the interests of not only the board on which they serve but also the bank for which they are simultaneously working (Byrd & Mizruchi, 2005). Thus, board members also differ with respect to the interest that they protect. That is, board members represent different stakeholders, defined as "any group or individual who can affect or is affected by the achievement of an organization's purpose" (Freeman, 1984: 53).

To understand the impact of board members with different interests, we develop the concept of 'stakeholder diversity', which is defined as the degree of heterogeneity of board members that represent different stakeholders. Stakeholders can present both a constraint and an opportunity to an organization. They can constrain the organization through their control over resources (Henriques & Sadorsky, 1999), but they can also be beneficial to the organization by providing inputs for knowledge creation and social capital (Dyer & Hatch, 2006; Krause, Handfield, & Tyler, 2007). Having diversity in this dimension is thus important to secure different stakeholders' interests (Abdullah, Ku Ismail, & Nachum, 2016; Goodstein et al., 1994; Triana et al., 2013).

A board with more stakeholder diversity can alleviate the constraints on the organization as securing different stakeholders' interests can allow an organization to garner more resources from these parties (Gazley, Chang, & Bingham, 2010). Moreover, different stakeholders pay attention to different issues that befit their interests and goals. Diversity will ensure that more perspectives will be brought into the board's decision-making process. Hence, such boards may be more adequate in ascertaining more and different resources for the organization. They will also be more adept at monitoring top management since the perspectives of multiple stakeholders will be taken into account. Yet, to understand how stakeholder diversity will affect political decision making, we first discuss the specifics of the political decision-making concept.

Political Decision Making

Political decision making occurs when decision-makers form coalitions and take a position with which their group's interests are protected and maximized (Elbanna & Child, 2007). Politics is defined as the "intentional acts of influence to enhance or protect the self-interest of individuals or groups" (Allen, Madison, Porter, Renwick, & Mayes, 1979: 77). The pursuit of this self-

interest is often at the expense of organizational goals (Kreutzer, Walter, & Cardinal, 2014). Such acts may involve forming coalitions, lobbying, withholding information, and controlling agendas (Eisenhardt & Bourgeois, 1988). For instance, coalitions promote their view as the only accurate solution (Shrivastava & Grant, 1985). Finally, the preference of the most powerful coalition will triumph (March, 1962; Pfeffer & Salancik, 1974). Political decision making is usually said to occur in situations where no common goals are present, where preferences and beliefs differ, and where it is unclear whose beliefs should guide the decision (Pfeffer, 1981). That is, politics arise from conflict (March, 1962; Pfeffer, 1981) and from situations where power is not distributed equally (Shepherd & Rudd, 2014).

Innovativeness

Innovativeness can be considered a planned attempt to derive expected benefits from change (West & Anderson, 1996). Mintzberg, Raisinghani, and Théorêt (1976) describe a general three-step strategic decision-making process, namely, identification, development, and selection, which can be used to evaluate innovation decisions. The identification phase occurs at the operational level and among middle managers, as that is where the practical diagnosis can be done and where possible improvement is generally first recognized. The development stage also occurs at the middle manager level, as they have the resources (time and knowledge) to pursue such possible improvement. The selection phase (screening, evaluation, and authorization) generally occurs among the top management team, who will decide whether to implement or prevent the innovation (Hambrick & Mason, 1984). Thus, the innovation decision is dependent on not only the final decision-makers but also lower level employees and middle managers. Whether they choose to communicate their ideas is of significant importance to innovation decisions.

Hypothesis Development

The Influence of Stakeholder Diversity on Political Decision Making

Essential in the work on team diversity is that diversity evokes conflict (e.g. Knight et al., 1999; Pelled, 1996; Pelled, Eisenhardt, & Xin, 1999). On the one hand, diversity in the knowledge bases of team members evokes task-related conflict—that is, discussions on what needs to be done by the organization (Jehn et al., 1999). Consequently, team members become aware of (1) more issues, (2) more viewpoints regarding the issues, and (3) more alternative solutions (Barkema & Shvyrkov, 2007). On the other hand, diversity can spur emotional conflict in which arguments are interpersonal (Amason, 1996; Jehn et al., 1999; Pelled et al., 1999), especially when there is low group emotion regulation (Van den Berg, Curseu, & Meeus, 2014). It has thus been hypothesized that task-related conflict results in positive team outcomes and that emotional conflict results in negative team outcomes (Pelled, 1996).

However, it is not the type of conflict per se that is the mechanism by which diversity leads to positive or negative outcomes. It is important to understand whether such conflict is resolved politically. Members of different stakeholder groups may engage in political tactics to sway the board in viewing the particular issue with which their department faces with as being pertinent while understating or failing to grasp other departments' concerns (Beyer et al., 1997; Dearborn & Simon, 1958). That groups have different interests is inherently present in the stakeholder diversity construct, since stakeholders are defined by their interests (Bantel & Jackson, 1989; Lant, Milliken, & Batra, 1992; Wiersema & Bantel, 1992).

There are four reasons why we may expect stakeholder diversity to affect the

degree of political decision making. First, when diversity implies disagreements over strongly held beliefs, as is often the case for stakeholder diversity, extensive decision making may lead to less constructive discussions, not issue resolution (Glick, Miller, & Huber, 1993). One group may be inclined to go behind the back of other teams to address strategic issues, making the process less comprehensive (Simons, Pelled, & Smith, 1999). Furthermore, for board members representing one group of stakeholders, providing complete information on their viewpoint can leave them vulnerable to discretion from other board members. For instance, board members can be placed in a dire negotiation position when they express the exact amount of budget that they want to allocate to a certain project that benefits a certain stakeholder group.

Second, boards with more stakeholder diversity will also have more disagreements, as they have different views on issues and solutions (Glick et al., 1993). Individuals in more diverse teams will have different interests that influence whether they pay attention to certain issues, how they interpret the issue, and how they view the best potential course of action. For instance, a division manager whose division has overcapacity will be more inclined to vote for a course of action that will relieve his overcapacity problem, although this may not be in the best interest of the overall firm. Thus, by virtue of having different interests, the use of political tactics may increase as diversity increases.

Third, social identity prescribes that individuals classify team members of diverse groups into in-group categories and out-group categories, where they identify more with their in-group than with the out-groups (Tajfel & Turner, 1979). Consequently, individuals tend to favor in-group members over out-group members (Tajfel & Turner,

1979). Such behavior can elicit political behavior, as individuals across groups will have to employ tactics that will justify their preference for suggestions made by in-group members and their repulsion toward suggestions made by out-group members.

Fourth, (stakeholder) diversity induces task-related conflict (Jehn et al., 1999), which can rapidly deteriorate into social conflict (Jarzabkowski & Searle, 2004). Perceived personal attacks evoke emotional behavior that is political in nature (Jarzabkowski & Searle, 2004). Thus, individuals in a (stakeholder) diverse team are likely to engage in politics in order to further their interests. Overall, these four arguments lead us to the following hypothesis.[11]

H1: Stakeholder diversity positively influences the extent to which the board of directors' decision-making process is political.

Political Decision Making and Innovativeness

In political decision making, decisions are made by the most powerful coalition. Not every member is valued equally, and thus, not all opinions and viewpoints are considered similarly. In general, there are three reasons why political decision making hampers organizational outcomes.

First, political tactics involve the distortion and restriction of information flows between coalitions (Bourgeois & Eisenhardt, 1988; Cyert & March, 1992; Dean & Sharfman, 1996). Thus, when deciding on the budget allocation for innovation projects, information regarding the project is distorted or withheld. Thus, it is increasingly difficult for board members to understand the intricacies surrounding innovation projects, making it less likely that they will commit resources to these inherently risky projects.

[11] Since stakeholder diversity specifically relates to the different interest of the board members, other types of diversity (e.g., gender diversity) may have a different effect on politics. To study this, we include gender diversity in our analyses.

Second, political decision-making processes are time consuming because of their divisive nature (Bourgeois & Eisenhardt, 1988; Elbanna, 2006). Given the limited time and attention that decision-makers have (Ocasio, 1997), decision-making topics that require more time will force other topics to be postponed for later meetings. Political processes force attention to a mixture of interests, power bases, and positions (Dean & Sharfman, 1996). This situation draws attention away from what should be decided given current environmental conditions; thus, suboptimal and fewer decisions that deteriorate organizational innovativeness will be made.

Third, some innovation projects that may not benefit the dominant coalition of the organization may be excluded altogether. Political decision-making processes are centered on the self-interests of individuals or groups instead of organizational goals (Dean & Sharfman, 1996). Self-interests can be in conflict with organizational goals (Dean & Sharfman, 1996). For instance, the directors in water authorities are elected and thus not keen on allocating resources for innovation projects that only have long-term benefits; they would rather use resources to relax tax rates if the project does not benefit the interests of the group that they represent. Thus, only a subset of the innovation projects—those that are in line with the interests of the most powerful group—will be pursued, again leading to less innovativeness.

In sum, in a political board of directors, information is restricted and distorted, limited innovation projects will be considered, and the opinion of the most powerful coalition/person triumphs.[12] Therefore, it is expected that political activity in the board of directors' decision-making process decreases decision-making quality and the selection of innovative alternatives, resulting in the following hypothesis:

[12] Political decision making at the board level can also positively influence innovation, since it may allow innovations that are in line with the interest of specific groups of the organization to be implemented. Yet, such behavior can evoke political behavior from other groups in the organization, for which the innovation is not in their interest, which leads to a distortion of information, a time-consuming process, and attention to be drawn away from current environmental conditions. Ultimately, this situation then leads to lower innovativeness.

H2: Political board of directors' decision-making negatively influences the innovativeness of an organization.

The arguments presented above indicate that stakeholder diversity increases the amount of politics in the board of directors' decision making and that politics, in turn, decrease organizational innovativeness. Thus, stakeholder diversity does not directly predict organizational innovativeness. Although (stakeholder) diversity may invoke conflict that may (when conflict is task related) or may not (when conflict is emotional) allow the organization to be more innovative, it is crucial to understand how conflict is resolved and thus decisions are made. Even task-related conflict, if it is resolved politically, may have negative consequences for organizational innovativeness, since information will be distorted, the process will be more time consuming, and the opinion of the most powerful coalition will triumph. Hence, to understand the link between stakeholder diversity and innovativeness, it is imperative to study the mediating effect of politics. Given that we hypothesize that stakeholder diversity influences politics and that politics influences innovativeness, we argue that politics thus mediate the relationship between stakeholder diversity and organizational innovativeness.

Specifically, in this context, members of the board of directors, by virtue of the Water Authorities Act of 1991, engage mostly in decision control and do not propose their own innovation initiatives. Therefore, the source of innovation generally lies with middle management (as also indicated in the previous chapter of this dissertation). A board with greater stakeholder diversity thus becomes more difficult to convince, as board members with more discrepant views need to be persuaded of the merit of the innovation. Innovations that do not cater to a specific stakeholder group incite those

representatives to engage in political behavior in order to obstruct the decision. In turn, this political behavior will lead to decreased innovativeness, which again shows the mediating effect of politics. Consistent with agency theory, then, will the board of directors provide checks and balances on the middle managers' desire to innovative?

H3: The board of directors' political decision making mediates the relationship between stakeholder diversity and organizational innovativeness.

Methodology

We test our hypotheses in the Dutch water authority sector, not to be confused with water utilities (Van den Oever & Martin, 2015). The Dutch water authorities are one of the main expert organizations in the field of water management. They focus on safety (e.g., against flooding of rivers), water quantity (e.g., the availability of fresh water for farmers), water quality (e.g., the quality of pond water; the habitat for fish), and sewage treatment. This task is important since the Netherlands has a complicated system of drainage ditches, canals, and pumping stations to keep the low-lying parts dry (and wet) for habitation and agriculture. Water authorities have existed since the twelfth century, and they are one of the oldest forms of local authority in the country, having been vested in the Dutch constitution since 1848 (Van den Oever & Martin, 2015).

As of 2016, 22 water authorities exist in the Netherlands. A fundamental attribute of these organizations is that their board of directors is chosen via public election every four years. Another fundamental attribute is that they represent a separate public governance level, alongside the Dutch national government, province, and municipality administrations. They can thus levy their own taxes. However, water authorities are considered to be functional bodies whose remit is limited to public water management, unlike other more general government

authorities.

Although water authorities are public organizations, their governance is quite similar to that of business firms. Each has a board of directors of approximately 25 individuals (the exact number depends on the size of the water authority) who are elected for four-year terms and who meet approximately every two months. Of these directors, five typically also compose the top management team, which meets approximately every two weeks. The chair of the top management team is appointed by the Crown (the national government), typically for six years. The strategic decision-making process is structured so that the top management team first decides on an issue at hand, and then (depending on its importance), the board of directors makes the final call. If the decision is relatively minor, the board will not be involved at all.

Data Collection

We considered the population of 27 water authorities during the period 2008-2014.[13] The unit of analysis for this study is each regional water authority per year, resulting in 170 observations.[14] To gather information on innovativeness, we collected news articles from the Factiva database. To measure politics, we collected the internal minutes and decision lists of board of director meetings of each water authority. To measure various control variables, we collected the annual reports of the water authorities. To measure innovativeness and the forms of decision making, we transformed the qualitative data into quantitative data by using content analysis.

Content Analysis

Content analysis has become an important tool for analyzing a variety of research questions (Duriau et al., 2007; Short, Broberg, Cogliser, & Brigham, 2010). The basic method involves

[13] A large number of mergers occurred before 2008 in the water authority sector. Since we manually collected the data on each water authority, extending the time period to before 2008 would have greatly challenged the organizations' memory. To ensure their cooperation, we chose not to go back further than 2008.
[14] Since a number of mergers occurred during 2008-2014, the number of observations is slightly lower than 27*7.

word frequency count (Duriau et al., 2007). We apply the eight-step procedure of Weber (1985), 'The Weber Protocol', with a recording unit of 'words'. Emphasis lies on defining categories, testing keywords, assessing the reliability of keywords, revising the dictionary, and thereafter, coding the text. Content analysis functions by finding word counts of keywords that indicate a certain cognitive scheme or thought orientation (Woodrum, 1984).

The keywords used in this analysis exist in dictionaries. Usually, dictionaries are created based on previous studies. However, none of the variables used in this study have been measured by content analysis before; thus, we needed to build a new dictionary for each decision-making dimension and for innovativeness. To compose the dictionaries, the most relevant and valid keywords were chosen based on testing the keywords. The relevant keywords were selected based on the hit rate, correctly observed hits, of at least 0.8 (80%) (Porac, Wade, & Pollock, 1999), and then on the highest number of occurrences/hits.

Dependent Variable

$Innov_{i,t}$. Researchers often measure innovativeness by assigned patents, new product introductions, productivity, or accounting measures, such as revenue growth (e.g. Lavie & Drori, 2012; Love, Roper, & Vahter, 2014; Sampson, 2007). In the case of the Dutch water authorities, none of these measures can be used, as they are government institutions, so they do not aim to make profits and do not usually apply for patents. Therefore, we used a more direct measure: the number of reported innovation projects. We measure this variable by investigating news articles. Since the water authorities are public organizations and since the Dutch population elects the board, innovations are publicly reported to show progress. We discussed the use of this measure for innovativeness with the water authorities, and they endorsed the use of this measure.

The keywords to uncover innovativeness are based on the definition provided by Gibbons

et al. (1994). For water authorities, innovativeness is defined as the application of concepts and ideas that are novel to the organization. These novel concepts or ideas may be embodied in products, processes, or services, as well as in organization, marketing, or management systems. We also sought to incorporate the dictionaries developed by Ceci and Iubatti (2012) and Uotila, Maula, Keil, and Zahra (2009). Consequently, we obtained the following dictionary: project, investment, experiment, trial, test, pilot, new, and scoop. The proposed keywords were tested for their false hit rates based by randomly reviewing 10 articles per year. For each keyword, at least two years and 20 articles were reviewed. Using 0.40 as a threshold for the false hit rate, the two keywords 'trial' and 'experiment' were chosen. Their false hit rates and number of total hits were 0.1750 and 254, respectively, for 'trial' and 0.2250 and 1151, respectively, for 'experiment'. For 'trial', an example of the context in which the word was located in was "Water authorities Velt en Vecht and Reest en Wieden will conduct a trial with a mowing collection boat in the Oranjekanaal against exotics this week". For 'experiment', this was "Such a two-staged experiment [for developing a new fish ladder] was recently executed at Water Authority De Dommel.".

To identify the relevant news articles, we added the search term 'waterschap' or 'wetterskip' or 'hoogheemraadschap' (synonyms for water authorities in Dutch). An example of a search command would be 'All of these words: experiment' and 'At least one of these words: waterschap wetterskip hoogheemraadschap' in the 'date range of 01-01-2008 to 31-12-2008' in 'Dutch'. We checked whether each news article reported an innovative project by a water authority. We then took the sum of the hits per organization *i* during year *t*.

Independent Variables

$Stakeholder\ diversity_{i,t}$. We measured stakeholder diversity by observing the stakeholder

category that the director represents on the board. There are four categories of directors who represent (1) inhabitants, (2) firm owners (excluding agricultural firms), (3) agricultural firms, or (4) nature. Representatives of the inhabitants are selected through a voting process by all inhabitants of the region in which the water authority operates. Representatives of firm owners are selected by the chamber of commerce. Representatives of agricultural firms are selected by the employer's organization for the agriculture industry, the Dutch Federation of Agriculture and Horticulture. Representatives of nature are selected by the Dutch Forest and Nature reserve owners' association. The province in which the water authority is located decides on the number of seats that each category has on its board of the directors. Hence, diversity is exogenous to the water authorities.

Although the directors are all responsible for the appropriate execution of the water authority's tasks, directors' opinions on how this should be done may vary. In particular, their role as representative for a certain category may influence their opinion. For instance, a representative from agriculture will more likely seek to secure funds for projects that benefits local farmers. After their term, a more successful representative is more likely to be selected again (or voted in again), which is one of the prime individual goals of the directors.[15]

Since every water authority is tasked with water management in its own region, water authorities do not face competition. As a population of organizations, they can be dismantled only by the national government. Even then, their existential right is vested in the constitution; thus, dismantling these organizations would require a change in the constitution, with all the onerous procedures involved. Indeed, such a move would involve the dismantling of *all* water authorities: a single water authority cannot be dismantled. Nevertheless, the province in which

[15] In a random selection of 17 instances of task-related conflict in the meeting minutes, no evidence was found that certain categories of stakeholders are more likely to be in conflict with each other. Therefore, the total degree of heterogeneity is important, not the inclusion of one type of stakeholder group.

the water authority is located, can decide on a merger between water authorities. If they are poorly performing, water authorities can in such a way be merged into more successful ones.

Although the poor performance of these organizations may have less severe consequences than that for other types of organizations, such as firms that can go bankrupt, the decision-makers are incentivized to ensure good performance. First, as previously mentioned, they are required by law to make sure that the organization executes its tasks properly. Second, the performance of a water authority is frequently and publicly benchmarked with that of others (e.g., by the biennially publication of the "Waterspiegel" report by the Regional Association of Water Authorities). Being a decision-maker of a relatively poorly performing organization is thus not in the personal interest of the directors and top managers. This effect is exacerbated by the fact that directors serve a four-year term, after which they are subject to election or re-nomination for the next term. Hence, it is in the board members interest to increase the performance of the organization, e.g., by accepting innovative projects that benefit the organization.

We used Blau's heterogeneity index, which is the reverse of the Herfindahl-Hirshman homogeneity index:

$$H = \sum_{i=1}^{n} S_i^2$$

where *H* is the homogeneity index, *S* is the percentage of directors who are representative for category *i*, and *n* is the number of different categories. Subtracting this homogeneity index from 1 yields Blau's heterogeneity index (Barkema & Shvyrkov, 2007; Wiersema & Bantel, 1992).

Board of Directors' Decision Making

The minutes of the board of directors were converted to quantitative data by searching keywords that characterize political decision making. Central to content analysis is the assumption that

analysis of language/text can provide an understanding of people's cognitive schemes—or in other words, thought orientation (Woodrum, 1984). This analysis can therefore display the composition of the decision making that is applied by a (group of) person(s).

The dictionaries were composed by performing an extensive literature review on politics. All studies listed by Eisenhardt & Zbaracki (1992) were investigated for measures. Additionally, we scanned the studies listed in Duriau et al. (2007) for overlapping themes measured by content analysis. Finally, we used a snowballing technique from the previously found articles to include as many relevant articles as possible. This process resulted in the investigation of 28 studies of political decision making.

The studies that were relevant because they provided a helpful description, criterion, or questionnaire were searched to find reoccurring themes. These themes were underlined to provide a clear linkage. Based on these themes, we developed the dictionary. Some additional keywords were found inductively, when we found false hit rates by reading minutes and thereby deriving new relevant keywords. These new words are indicated with a *. The false hit rates were found by testing seven (0.5% of the total number of documents) randomly selected minutes of a minimum of 12 pages.

To compose the final dictionary, the most relevant and valid keywords were chosen. This resulted in six keywords.[16] To increase the reliability of the final dictionary, it was checked by two professionals, who were familiar with the topic of board of directors' decision making and the methodology of content analysis.

We assessed convergent validity by regressing performance on our politics measure. Politics have been found to influence performance (Walter, Kellermanns, & Lechner, 2012);

[16] Since the words associated with some themes had a high false hit rate, not all themes are represented in our dictionaries.

thus, our measure should do so similarly. Measuring performance as the net costs per inhabitant, we indeed find that politics have a negative effect on performance ($\beta = -0.231$, $p = 0.014$).

Our final step was to establish discriminant validity. We did so by regressing two constructs that theoretically should not be related to politics: (1) the number of current collaborations and (2) the amount of slack resources.[17] For both constructs, we found no significant effects. Thus, we are confident that our dictionary indeed measures politics. $Politics_{i,t}$. Welsh and Slusher (1986) argue that it is not the decision-maker's intent but the focus and context in which a decision is made that identifies decision making as being political. The political orientation is thus measured by keywords that indicate a political context and focus.

Although content analysis seems to be a valid measurement method, Hills and Mahoney (1978) recognize early on that political power is difficult to measure. According to Pfeffer and Salancik (1974), political power is not possible to accurately record by using questionnaires or interviews, as recall of power is not likely to be accurate. Although no method is perfect, these findings further support the use of content analysis for the measurement of political activity in decision making instead. Based on a review of past literature, we created a dictionary. An overview of the literature on political measurements that we drew upon is provided in table 1.

[17] Since these variables affect innovation, we use these as control variables in our models. A description on how we measure these three variables is detailed under the section 'Control variables'.

Table 1

Overview of measures for politics

Cat.	Measurement/Characteristic	Author(s)
A	Being member of an (external) association	Hills & Mahoney, 1978; Pfeffer & Salancik, 1974
B	Unequal power distribution	Elbanna & Child, 2007; Kipnis, Schmidt, & Wilkinson, 1980; Shepherd & Rudd, 2014
C	Influence of people	Eisenhardt, 1989; Eisenhardt & Bourgeois, 1988; Kipnis, et al. 1980; Pfeffer & Salancik, 1974
D	Groups/ Coalitions/ Alliances	Eisenhardt & Bourgeois, 1988; Elbanna & Child, 2007; Kipnis, et al. 1980; Welsh & Slusher, 1986
E	Opportunistic behavior / Personal interests	Elbanna & Child, 2007
F	Goal conflict	Eisenhardt, 1989; Eisenhardt & Bourgeois, 1988; Eisenhardt, Kahwajy, & Bourgeois, 1997
G	Interpersonal disagreements	Eisenhardt, 1989; Eisenhardt & Bourgeois, 1988; Eisenhardt, et al. 1997; Elbanna & Child, 2007
H	Persuasion (techniques) / Develop support	Kipnis, et al. 1980; Welsh & Slusher, 1986
I	Hide or distort information to defend opinion	Elbanna & Child, 2007; Kipnis, et al. 1980

Based on these findings, we formulated the dictionary reported in table 2.

Table 2

Dictionary for politics

Cat.	English	Dutch	Total hits	False Hit rate	Example
D	We think	Wij denken	3	.0000	"We think that that is politically an important signal"
D	We find	Wij vinden	11	.0000	"We find that insufficient attention has been paid to nature"
*D	Fraction / Political group	**Fractie**[18]	122	.1803	"The VVD-fraction is actually the one that has said in some meetings that…"
D	Our opinion	Onze mening	6	.0000	"The development of nature restoration is, in our opinion, too passively executed…"
E	Preference	Voorkeur	5	.0000	"Togetherness has the preference, but the VVD does not want to wait…"
G	Discussion/ Conflict	Discussie	90	.2000	"The discussion on tax rates for agriculture and nature…"

We then counted and summed the occurrences of each word per organization i in year t.

Control Variables

We control for several factors. First, to compare the effect of stakeholder diversity with the mainstream diversity literature, we control for *gender diversity*. We use Blau's heterogeneity

[18] The word in bold is searched with the "Whole words only" option on, meaning that only this word will be searched for and not words that contain that word. For example, mission → commission.

index, which is calculated as the reverse of the Herfindahl-Hirshman homogeneity index:

$$H = \sum_{i=1}^{n} S_i^2$$

where *H* is the homogeneity index, *S* is the percentage of directors who are male/female *i,* and *n* is 2. Subtracting this homogeneity index from 1 yields Blau's heterogeneity index (Barkema & Shvyrkov, 2007; Wiersema & Bantel, 1992).

Second, we control for the *size* of the organization, measured by the number of inhabitants in the region in which it operates. This variable is relevant because as the population increases, a water authority needs additional sewage treatment capacity. Size may affect innovativeness because it shapes the executive influence on innovation (Elenkov, Judge, & Wright, 2005).

Third, we control for *negative attainment discrepancy (NAD)*. Confronted with negative attainment discrepancy (Lant, 1992), organizations are motivated to innovate. Aspirations are measured as the net costs per organization *i* in year *t*, drawn from the annual reports and budgets of water authorities. Water authorities focus on costs, since they would be forced to increase taxes owing to budget overruns. Since decision-makers are elected, increasing taxes may diminish their position in future elections. We measure negative attainment discrepancy by $NAD_{i,t} = \left| {A_{i,t} - P_{i,t}}/{A_{i,t}} \right|$, where $A_{i,t}$ denotes the aspiration level in terms of net costs of water authority *i* at time *t* and $P_{i,t}$ denotes performance in terms of the net costs of water authority *i* at time *t.* For each observation where performance is higher than the aspiration level, we set this variable to 0. A more positive value denotes higher negative attainment discrepancy.

Fourth, we control for *slack resources*. Slack resources influence innovativeness, as they allow organizations room to experiment (Greve, 2003). Following George (2005), we use the

level of cash reserves of water authority *i* at time *t* to measure slack resources. Cash is the most easily deployed resource and is thus an ideal measure for slack resources (George, 2005). Given the non-normal distribution of this value, we take the cubic root as our variable.

Fifth, we control for the *number of pages* in source documents, since as the number of pages increases, the likelihood that there will be words that describe politics increases.

Sixth, we control for the *number of files* per organization *i* in year *t.* A greater number of files means more (intense) board meetings, increasing the likelihood that there will be words describing politics and providing more room for discussion of innovation.

Seventh, we add *year dummies* to control for environmental influences. By implementing year dummies, external events such as the national economic situation that affect all organizations equally and that may influence decision outcomes are controlled for.

Eighth, we include *firm fixed effects*. The inclusion of such effects addresses possible factors that influence strategic decisions and innovativeness. Thus, differences in, e.g., organizational culture and political composition of the board, that remain stable over the years are controlled for.

Analysis

For the first dependent variable, politics, we employ the following fixed effects OLS (ordinary least squares) model:

$$Politics_{i,t} = \beta_0 + \beta_1 Stakeholder\ diversity_{i,t} + \beta_2 CV_{i,t} + FE_i + TE_t + \varepsilon_{i,t}$$

where $CV_{i,t}$ is a vector of control variables for organization *i* at time *t*, FE_i denotes the fixed effects, TE_t denotes time the effects, and $\varepsilon_{i,t}$ denotes the idiosyncratic errors.

For the second dependent variable, innovativeness, we employ a fixed effects OLS model with the following equation:

$$INNOV_{i,t} = \beta_0 + \beta_1 Politics_{i,t} + \beta_2 CV_{i,t} + FE_i + TE_t + \varepsilon_{i,t}$$

Endogeneity Test

One potential concern is that the politics variable might be endogenous in the second equation (Shaver, 2005). If so, using an instrumental variable (IV) approach is preferred over OLS (Shaver, 2005). However, given that we have a low number of observations and given the drop in efficiency when using the IV approach, we should use an IV only if politics is endogenous based on post-estimation checks after the 2SLS estimation.

We first run a 2SLS model, where we use the number of pages as an instrument for politics. The number of pages of all minutes of organization *i* at time *t* would increase the likelihood that there will be more words that describe politics. This instrument is assumed to be uncorrelated with the other dependent variable, namely, innovativeness.

First, we test the strength of the number of pages instrument. The F-statistic for the instrument is 172.689. This value far exceeds the threshold value of 10 proposed by Stock, Wright, and Yogo (2002). As such, we conclude that number of pages is a sufficiently strong instrument for politics.

Subsequently, we check whether politics is endogenous. For politics, the associated Durbin chi2 score and Wu-Hausman F-statistic are 3.627 ($p = 0.057$) and 3.402 ($p = 0.067$), respectively. As such, we also fail to reject the hypothesis that politics is exogenous. Based on this result, we use the fixed effects OLS models, as they are more efficient than the 2SLS models and as endogeneity is not a substantial concern.

Results

We check the multicollinearity and the distribution of the independent variables. Multicollinearity does not seem to be an issue, as all VIF scores are lower than 10. We also check whether the assumption of normality is violated, by winsorizing the outliers of the politics variable at the high end at the 95 and 99 percentile. Skewness improves when we use the 95th percentile winsorization; thus, we use the 95th percentile winsorized independent variable. Table 3 shows the mean, standard deviation, minimum and maximum of each variable. Table 4 provides the matrix of correlations among all variables.

Table 3

Descriptive statistics

Table 3. Descriptive statistics (n = 170)

Variable	Mean	S.D.	Min	Max
Innov	2.38	2.13	0	13
Stakeholder diversity	0.47	0.04	0.39	0.59
Politics	176.05	173.22	0	642
Gender diversity	0.30	0.07	0.09	0.44
Size	681395	320361.7	107741	1350000
NAD	1.18	3.74	0	33.96
Slack	64.31	69.97	-90.43	334.17
Number of pages	102.59	66.82	16	336
Number of files	7.82	2.15	4	14
ydm2009	0.15	0.36	0	1
ydm2010	0.15	0.36	0	1
ydm2011	0.14	0.35	0	1
ydm2012	0.14	0.35	0	1
ydm2013	0.14	0.35	0	1
ydm2014	0.13	0.34	0	1

Table 4

Correlation matrix

Table 4. Correlation matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Innov	1														
2	Stakeholder diversity	-0.17	1													
3	Politics	0.04	-0.14	1												
4	Gender diversity	0.04	-0.24	0.15	1											
5	Size	0.21	0.17	-0.52	0.35	1										
6	NAD	0.07	0.07	0.02	-0.05	0.07	1									
7	Slack	0.06	-0.04	-0.11	0.12	0.07	0.06	1								
8	Number of pages	0.19	0.87	-0.20	0.09	0.18	0.05	0.03	1							
9	Number of files	0.03	0.01	0.46	-0.07	-0.20	0.07	0.00	0.56	1						
10	ydm2009	-0.04	0.07	-0.05	-0.01	-0.03	0.12	0.15	0.13	0.21	1					
11	ydm2010	-0.03	-0.01	-0.05	-0.01	-0.03	0.07	0.02	-0.03	-0.05	-0.18	1				
12	ydm2011	0.08	0.05	-0.04	-0.01	-0.01	-0.03	0.03	0.04	0.02	-0.18	-0.18	1			
13	ydm2012	0.02	-0.04	-0.04	-0.01	-0.00	-0.05	-0.07	-0.12	-0.10	-0.18	-0.18	-0.17	1		
14	ydm2013	-0.08	-0.05	-0.03	0.02	0.04	-0.05	0.10	-0.06	-0.01	-0.17	-0.17	-0.17	-0.17	1	
15	ydm2014	-0.08	-0.00	-0.08	0.06	0.08	-0.08	-0.14	-0.01	-0.06	-0.17	-0.17	-0.16	-0.16	-0.16	1

Table 5 shows the results of the fixed effects OLS regression. Model 1 estimates the effect of stakeholder diversity on the extent of politics (with politics as the dependent variable), including several control variables. In model 2, we have a different dependent variable, innovativeness, which we regress on all the control variables. The third model reports a test of the second hypothesis, where, in addition to the control variables, we include the politics variable. The improved R^2 for the full model (model 3) shows that it has superior fit when innovativeness is the dependent variable.

Table 5
Fixed-effects OLS results

Model	**1**		**2**		**3**	
	DV = Politics		**DV = INNOV**		**DV = INNOV**	
	Coef.	p-value	Coef.	p-value	Coef.	p-value
Stakeholder diversity (H1 +)	625.307 (317.188)	0.049	-5.389 (8.884)	0.545	-2.070 (8.803)	0.814
Politics (H2 -)					-0.005 (0.002)	0.013
Gender diversity	-166.832 (299.282)	0.577	2.101 (8.382)	0.803	1.215 (8.220)	0.883
Size	0.000 (0.000)	0.340	-0.000 (0.000)	0.977	-0.000 (0.000)	0.877
NAD	-0.002 (1.467)	0.999	0.017 (0.041)	0.676	0.017 (0.040)	0.670
Slack	0.130 (0.115)	0.259	0.001 (0.003)	0.864	0.001 (0.003)	0.679
Number of pages	1.097 (0.144)	0.000	0.003 (0.004)	0.465	0.009 (0.005)	0.057
Number of files	2.314 (4.228)	0.584	0.028 (0.118)	0.813	0.040 (0.116)	0.729
Constant	-609.939 (428.187)	0.154	2.420 (11.993)	0.840	-0.817 (11.819)	0.945
Observations	170		170		170	
R^2	0.861		0.444		0.470	

Firm-fixed effects and time effects are included in all models.

In model 1, politics is the dependent variable. The positive coefficient is consistent with hypothesis 1 ($p = 0.049$). A one-unit increase in stakeholder diversity will, on average, increase the number of words that relate to politics by 625.307. However, since the values of our board diversity variable are between 0.39 and 0.59, we interpret the magnitude at a 0.04 increase (one standard deviation). A 0.04-unit increase in stakeholder diversity will, on average, increase the number of words that relate to politics by 25.01. Given the calculation of the board diversity

variable, it is difficult to interpret what a 0.04-unit increase means. As such, we use an example from our data where we keep board size equal. In this example, the organization has 17 directors who represent inhabitants—3 for firms, 4 for agriculture, and 1 for nature. In another year, this organization has 15 directors who represented inhabitants—3 for firms, 7 for agriculture, and 0 for nature. This equals to a 0.04 change in the stakeholder diversity variable.

By comparison, gender diversity has a negative effect (p-value = 0.577). Under the associated 95% confidence interval, a one-standard-deviation change in gender diversity may decrease or increase the number of words pertaining to politics in the range of -30.137 and 16.79. With such high variance in impact, we cannot conclude that gender diversity has an effect on politics.

We now turn to models 2 and 3, where innovativeness is the dependent variable. From model 3, it becomes clear that hypothesis 2, "Political decision-making negatively influences the innovativeness of an organization", is supported, as the relationship with innovativeness is negative, with a magnitude of -0.005 (p = 0.013). For each extra word indicating political activity in the minutes of an organization, there will be, on average, 0.005 fewer innovations in that year. It is logical that the magnitude for the politics measure is very small, as this is based on a change in innovativeness with a single extra word found.

We also report additional tests to understand the indirect and total effects of stakeholder diversity on firm innovativeness. We follow the approach of Preacher and Hayes (2004, 2008) by running two models (1 and 3) as seemingly unrelated regressions.[19] Using bootstrapping (5000 samples), the bias-corrected and accelerated 90% confidence interval for the indirect effect of stakeholder diversity on firm innovativeness through politics is -14.198 to -0.034, and

[19] We use this approach because it allows us to estimate the indirect effects of stakeholder diversity on organizational innovativeness. The Sobel test can also be used for this purpose; however, it assumes a normal distribution of the indirect effect. This assumption is likely to be violated, especially in small samples (Bollen & Stine, 1990). Hence, a better way to test the indirect effect is to use bootstrapping, as done in Preacher and Hayes (2004).

the coefficient is -3.318.[20] A one-standard-deviation increase in stakeholder diversity, on average, thus decreases the number of innovation projects by 0.133 through the effects of a decrease in politics. With a 90% confidence interval, these effects range from -0.568 to -0.001. Hence, on average, we find partial support for a negative indirect effect of stakeholder diversity on firm innovativeness through politics. Given that we cannot conclude that stakeholder diversity has a direct effect on innovativeness (p = 0.814), we can conclude that we find partial support for hypothesis 3: politics fully (or at least very largely) mediate the stakeholder diversity-innovativeness relationship.

In contrast, for gender diversity, we find an indirect effect on innovativeness through politics, and the effects of gender diversity on innovativeness range within a bias-corrected and accelerated 90% confidence interval from -1.646 to 5.474, with a coefficient of 0.885. A one-standard-deviation increase in gender diversity (0.07) will, on average, increase the number of innovative projects by 0.062, while the effects can range from -0.115 to 0.383.

Discussion

This study contributes to the literature on board diversity, decision making, and innovation. Findings in the board diversity literature have been inconsistent. The diversity literature is specifically in need of further insights into the mechanisms by which diversity affects various outcomes (Lawrence, 1997). Thus, instead of examining the direct effects of board diversity on innovativeness, we focus on explaining and testing the mechanism by which board diversity influences innovativeness. We introduce a new concept, stakeholder diversity, which reflects the differences in members' interests. Although different members may theoretically enrich the

[20] We use a 90% confidence interval for three reasons. First, we have data on the complete population of organizations; thus, p-values are not relevant for hypothesis testing (Schwab, Abrahamson, Starbuck & Fidler, 2011). Second, the economic impact is large (for a 0.133 decrease in innovativeness, the mean of innovativeness is 2.38); thus for many cases, stakeholder diversity has a large impact. Third, the *n* is relatively small (n = 170); thus, p-values are likely to be higher. We have no means of increasing the *n*, as we have the full population of organizations.

team by providing unique resources, networks, and expertise (Bantel & Jackson, 1989; Triana et al., 2013), when these members differ in their interest, discussions will become more political, mitigating the potential of such diversity. Our finding of an indirect positive effect of gender diversity on firm innovativeness, although statistically nonsignificant, shows that differences in interests (rather than background, as in gender) are key in explaining the kind of outcome for diversity. We also support prior literature (e.g. Engelen, Van den Berg, & Van der Laan, 2012) in showing that different types of diversity may have different mechanisms by which they affect outcomes (stakeholder vs. gender diversity), which can prove a fruitful avenue for future research.

This study contributes to the decision-making literature by showing the significant negative influence of board of directors' political decision making on innovativeness. Hence, we provide evidence that the degree of politics in decision making affects organizational outcomes, over and above the effectiveness of decisions (Elbanna & Child, 2007).

This study also adds to the innovation literature. Specifically, it shows that board of directors' decision making should be considered an important antecedent to innovativeness. Thus far, politics in decision making is underemphasized in the literature on innovativeness. Additionally, this study shows the indirect negative effect of stakeholder diversity on innovativeness.

This paper also makes a methodological contribution. We provide new measures for our dependent variables of interest: political decision making and the innovativeness of an organization. We derive a new dictionary to arrive at a new, quantitative measure of politics in decision making. Thus, we offer a renewed approach to measuring politics, hopefully stimulating future research. We formulate a new output measure of innovativeness based on an adapted version of content analysis. This method is generalizable to many other industries and situations, contributing a solution to the issue of measuring innovativeness in a generalizable way.

For practice, the study shows that, all else equal, organizations with board members with diverse interests will negatively affect firm's innovativeness. Firms that employ boards with significant stakeholder diversity should be aware of the pitfalls of such diversity and manage it accordingly. Specifically, conflicts should not be resolved politically. For instance, the chair of the board can influence the board to be more conscious of this situation.

Limitations and Suggestions for Future Research

Notwithstanding its contributions, this study has some limitations that offer areas for future research. One possible limitation of this study is the external validity. Although water authorities are government institutions, the findings should be generalizable to other organizations with a board of directors. These boards meet regularly to make strategic decisions, and they have responsibilities, such as budget and resource allocation. They also oversee a management team, very comparable to the executive committee, who handle daily matters. The water authorities' board of directors is mostly engaging in decision control, in which case a homogeneous board may be more fruitful for the acceptance of innovation proposals. However, when the board also has other roles, such as initiating innovation proposals, stakeholder diversity can have a different net effect, as it enables the inclusion of more perspectives; however, the board's attention conversely is scattered between more tasks (Dyer & Hatch, 2006; Krause et al., 2007). Our research setting has thus allowed us to specifically examine the effect of diversity when the board of directors solely engages in decision control and when board diversity has been determined exogenous. Nevertheless, replication in different settings is warranted.

An alternative mechanism by which board-level political decision making may affect innovation is by repulsing innovation proposals from middle managers. In political decision making, decisions are made by the most powerful coalition. Hence, not every member is valued equally, and thus, not all opinions and viewpoints are considered similarly. Middle managers are thus likely to perceive a signal that not everyone is taken seriously, which may create a

threshold for communication with the board. After all, decision-makers may not be open to other ideas, and they are intended to pursue alternatives that only further their own interests. Hence, politics in the board of directors' decision-making process creates a less favorable context for middle managers to propose their ideas. Such unfavorable context limits the interaction between middle managers and top management, resulting in fewer innovation ideas that will be discussed in the board of directors' decision-making process (Brown & Eisenhardt, 1997). Such effects could be a potential avenue for future research.

Methodologically, some side issues should be noted. First, the minutes used to gather the data for the board of directors' decision making were written by a professional secretary. It is possible for a secretary to slightly adapt certain discussions in order to omit unfavorable statements. On the other hand, we deem the minutes reliable, as they need to be approved by the entire board, and we observed that they usually quoted exactly what was said. Furthermore, because there were no predefined dictionaries available, we developed a new dictionary. Although internal validity should be verified, "most content analysis would benefit from the construction of special-purpose dictionaries" (Krippendorff, 2004) of this type.

Conclusion

We started this chapter by considering the conflicting findings in the board diversity-organizational outcomes literature. Our fundamental point is that different types of diversity, specifically those that pertain to the interests of individual board members, have adverse effects by increasing the amount of politics in the board of directors' decision-making process. In turn, this reduces the innovativeness of the firm. To test our theoretical predictions, we applied content analysis and developed unique dictionaries. We hope our research inspires others to further develop the literature on board diversity, decision making, innovativeness and other organizational outcomes.

Chapter 4

In deep water: Negative attainment discrepancy, organizational attention, and interorganizational relationship formation in the Dutch water authority sector

Abstract

The attention-based view can be used to explain what type of organizational changes are enacted, but this view is relatively silent on when decision-makers act upon their attention to enact such changes. Synthesizing the attention-based view with the behavioral theory of the firm fills this gap. We theorize that the influence of four categories of attention on interorganizational relationship formation is moderated by negative attainment discrepancy: a weaker relationship for attention on (1) internal issues and (2) different organizations in the external environment, and a stronger relationship for attention on (3) interorganizational collaboration and (4) similar organizations in the external environment. Applying topic modeling to longitudinal data from the Dutch water authority sector for 2008-2014, we find that organizations are more likely to form an interorganizational relationship when attention is on interorganizational collaboration and not on internal issues and different organizations; we also find that this effect is moderated by negative attainment discrepancy. We discuss theoretical implications, particularly with regard to extending the attention-based view and the behavioral theory of the firm, and phenomenological implications, particularly for research on interorganizational relationships.

Introduction

Organizational attention, defined as "the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers on both […] issues […] and answers" (Ocasio, 1997: 189), has been used to explain why specific organizational decisions are made (Ocasio, 1997). By understanding what an organization pays attention to, one can identify what type of answers the decision-makers notice, encode, and interpret, and where they focus their time, effort, and resources (Rerup, 2009; Sullivan, 2010; Wilson & Joseph, 2015). As such, organizational attention has been used to explain local versus distant search (Wilson & Joseph, 2015), regulation setting by public organizations (Sullivan, 2010), and strategy change (Cho & Hambrick, 2006).

Cho and Hambrick (2006) proposed that organizational change can be explained by changes in organizational attention. Those organizations that are more mindful of changes in the environment may change their organizational attention so that actions will be undertaken to ensure organizational fit with the environment (Cho & Hambrick, 2006). However, organizational change does not necessarily require a change in attention. In fact, the impetus for change may also come from within the organization in the form of unsatisfactory performance (Cyert & March, 1992). This paper intends to study when decision-makers act upon their attention to enact organizational change.

The behavioral theory of the firm asserts that unsatisfactory performance is one of the main drivers of organizational change (Cyert & March, 1992). Organizations stick with the status quo unless performance is unsatisfactory (Cyert & March, 1992). Confronted with negative attainment discrepancy, i.e., when performance drops below the aspiration level of the decision-maker (Lant, 1992), organizations are motivated to change, with the aim of improving their

performance. For instance, negative attainment discrepancy prompts organizations to engage in more efforts at business and technological innovation (e.g. Chen & Miller, 2007; Gaba & Joseph, 2013; Greve, 1998b, 2003; Kacperczyk, Beckman, & Moliterno, 2015; Moliterno, Beck, Beckman, & Meyer, 2014; O'Brien & David, 2014), acquisitions (Iyer & Miller, 2008; Kim, Finkelstein, & Haleblian, 2015), divestitures (Vidal & Mitchell, 2015), R&D intensity (Lucas, Knoben, & Meeus, 2015) and R&D alliances (Tyler & Caner, 2016).

By synthesizing the attention-based view with the behavioral theory of the firm, we attempt to predict which organizational changes will be made and when. As organizational attention shapes what types of solutions are considered and thus what type of decision is made, negative attainment discrepancy provides the trigger for engaging in search and change. It is this paper's aim to advance this synthesis.

We study this topic by analyzing the formation of shared facilities through the interorganizational relationship (IOR) formation decisions of Dutch water authorities, though we consider other dependent variables in the discussion section. In this setting, the shared facilities are formed to reduce costs. The water authorities are responsible for managing water barriers, for maintaining the level and quality of water in waterways, and for sewage treatment in their respective regions. Given their territorial boundaries, water authorities are not strict competitors, although decision-makers are motivated to benchmark other water authorities; they do not want to underperform relative to their peers. Especially because a considerable portion of top management, as well as of the board of directors, are elected by the public, the decision-makers are motivated to perform well if they seek to be re-elected. Other decision-makers are nominated but still depend on their professional constituency, which pays attention to performance. Additionally, given the high visibility of these organizations to the public, there is a strong

incentive for all board members to perform well (e.g., the local community can criticize the inefficient spending of tax money).

Shared facility formation is relevant in this research setting, as decisions about facilities are made by the top management team based on a finite set of options, which allows us to better examine the impact of organizational attention. Furthermore, studying shared facility formation in this setting allows us to examine and compare the effects of four attention foci that vary in their relatedness to the shared facility decision. We elaborate on this choice of setting in the Methodology section.

In synthesizing the attention-based view and the behavioral theory of the firm and applying it to the IOR context, this study makes three contributions. First, by synthesizing the attention-based view with the behavioral theory of the firm, our contribution is to show how organizational attention shapes *which* type of decision is more likely to be made in response to negative attainment discrepancy. We also contribute to expanding and operationalizing the attention-based view by linking it more firmly with behavior decision theory and also by demonstrating that topic modeling can be used to measure broader categories of attention, to which other textual methods cannot do justice. Second, with regard to the behavioral theory of the firm, we aim to make a theoretical contribution by identifying the boundary conditions under which negative attainment discrepancy influences decisions, and more specifically, shared facility decisions. We also elaborate a theoretical answer not only to the question of *whether* the organization reacts but also *in what direction* this reaction occurs. Third, the IOR literature is increasingly exploring behavioral determinants (e.g. Tyler & Caner, 2016), and we contribute to this field by showing that a synthesis of attention-based and behavioral theories can shed new light on cost-reducing IOR formation. Specifically, the literature has underemphasized cost

reduction initiatives, but these initiatives are actually quite important.

Conceptual development

The attention-based view of the firm proposes that what decision-makers do depends on the issues and answers upon which they focus their attention (Ocasio, 1997). Attention is defined as "the noticing, encoding, interpreting, and focusing of time and effort by organizational decision-makers on both (a) *issues*; the available repertoire of categories for making sense of the environment: problems, opportunities, and threats; and (b) *answers*: the available repertoire of action alternatives: proposals, routines, projects, programs, and procedures" (Ocasio, 1997: 189; emphasis in original). The central idea of this strand of research is that attention shapes the issues and corresponding potential answers upon which decision-makers focus (Rerup, 2009; Wilson & Joseph, 2015).

Attention can be paid to a variety of factors, such as technology (Eggers & Kaplan, 2009; Kaplan, 2008), internal vs. external determinants of CEO succession (Thornton & Ocasio, 1999), and competitive and market forces (Nadkarni & Barr, 2008). Researchers generally focus on a particular form of attention as befits their research question. This is understandable given the research methods they have at their disposal, which makes it difficult to hypothesize about broader categories of attention.

In general, direct effects of organizational attention have been found to influence a variety of strategic actions, such as the development of an expansive global strategy (Levy, 2005), technological responsiveness to competitors (Eggers & Kaplan, 2009), and speed of response to task and sector changes (Nadkarni & Barr, 2008). Yet, these papers considered an external impetus for the need for change, e.g., the emergence of a new technology (Eggers &

Kaplan, 2009). Similarly, an internal impetus for the need for change can explain how attention influences strategic actions. The behavioral theory of the firm provides a useful anchor upon which to theorize how such an internal impetus would work.

A key objective of the behavioral theory of the firm is to understand when organizations decide to change their current practices and thus to search for alternatives. As Cyert and March (1992) explain, organizations are not engaged in a constant search for alternatives; such a search process is initiated due to specific cues:

> *… we do not expect to find – and do not find – anything like a constant level of search. Rather, there are search procedures called into play on various cues such that for any given situation there is a standard search response. […] there is search when existing decisions are perceived as inadequate. (Cyert & March, 1992: 93)*

As illustrated by this quote, a search for alternatives is initiated when the organization encounters a problem. The following quote elaborates on this:

> *Search within the firm is problem-oriented. A problem is recognized when the organization either fails to satisfy one or more of its goals or when such a failure can be anticipated in the immediate future. So long the problem is not solved, search will continue. (Cyert & March, 1992: 169-170)*

Thus, search begins when the current performance of the organization falls or is expected to fall below its goals, or in other words, when performance falls below the aspiration level (Cyert & March, 1992; Lant et al., 1992). Aspiration level denotes the value that serves as a threshold for an outcome to be deemed satisfactory by the decision-maker (Schneider, 1992). For the decision-makers responsible for the organization, this aspiration level is determined by a mix of "the organization's past goal, the organization's past performance, and the past performance of other

comparable organizations" (Cyert & March, 1992: 162). When performance falls below aspiration, this is considered negative attainment discrepancy, which denotes the "discrepancy between prior aspiration level and actual performance" (Lant, 1992: 624). The discrepancy is negative when actual performance is below aspiration level.

The two aspiration levels typically studied in the literature are social and historical. Historical aspiration level reflects the organization's past performance, and social aspiration level involves the performance of comparable peer organizations (Argote & Greve, 2007). Although the original theory proposes that aspiration level is determined by a mix of historical and social performance (Cyert & March, 1992), historical and social aspiration levels are treated heterogeneously in the literature. Some scholars state that organizations pay attention to either one of the two levels (Greve, 1998b), while others argue that these levels have independent effects (Audia & Greve, 2006), and still others argue that both aspiration levels reinforce each others' effects (Joseph & Gaba, 2015). Nevertheless, both aspiration levels similarly induce problemistic search.

The search stops when an alternative is discovered that will satisfy the aspiration of the organization. As Cyert and March (1992) argue: "We assume that organizations make decisions by solving a series of problems; each problem is solved as it appears; the organization then waits for another problem to appear" (p. 167). Having discovered the solution, the organization makes a decision and resumes its ongoing business.[21]

[21] There are studies that find that the organization will be more likely to change as positive attainment discrepancy increases (e.g. Kacperczyk et al., 2015; Lehman & Hahn, 2013). This is the case when the change is risky. IORs cannot be labeled as risky in general; in fact, in some cases they are used to reduce risk (e.g. Hagedoorn, 1993; Oliver, 1990; Powell et al., 1996; Ring & Van de Ven, 1992). Thus, we refrain from hypothesizing on risk-taking and the effect of positive attainment discrepancy.

Hypothesis development

When considering in-house production versus setting up a shared facility through IOR, there are two categories of attention that would be expected to play (the most) significant roles given that they are closely aligned with the two governance choices: attention to internal operations versus attention to the external environment.[22] An organization attends to more issues and answers related to its internal operations (external environment) when it discusses problems, opportunities, and threats that are central to its internal operations (external environment) and when it discusses proposals, routines, projects, programs, and procedures that relate directly to its internal operations (external environment).

If the focus of their attention is on internal operations, decision-makers will have greater knowledge of the possibilities and potential alternatives that are embedded in those internal operations. Some alternatives from the external environment may also be considered in the search process, which, from the viewpoint of the internally focused decision-maker, are more distant with respect to the internal alternatives. Alternatives that are more distant are difficult for the decision-maker to process, as their validity and potential are difficult to assess (Piezunka & Dahlander, 2015). To cope with their cognitive limitations, decision-makers are prone to drop these more distant alternatives from the search process (Piezunka & Dahlander, 2015). As such, the alternatives considered in the search process will relate to the organization's internal operations. Consequently, the decision adopted for solving the

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Moreover, the threat-rigidity hypothesis proposes that as decision-makers increasingly experience the issue as a threat, due to psychological stress (among other reasons), they become restricted in information processing and constrict control (Staw, Sandelands, & Dutton, 1981). Consequently, they will refrain from making changes and will remain with the status quo. In such cases, the decision-maker focuses on a different reference point as its aspiration level: the survival point. The organizations in our empirical setting have limited financial risks and cannot go bankrupt; hence, this point is irrelevant when hypothesizing about our setting. Accordingly, similar to Lim and McCann (2014), we do not assume that extremely poor performance threatens the firm's survival.

[22] Although we acknowledge that this is just one dimension on which one can view organizational attention, we do argue that it is one of the most central (see also Ocasio, 1997).

problem will likely be an internal one. For instance, when costs are outrunning the budget, an organization in which organizational attention is on internal operations will seek to reduce waste in its processes to increase efficiency and thus reduce costs.

Furthermore, because of cognitive limitations, individuals can only pay attention to a select number of issues, that is, attention is finite (Cyert & March, 1992; Ocasio, 1997). In other words, decision-makers are selective in their attention (Ocasio, 2011). The more decision-makers attend to internal operations, the less they can notice and act on other issues (Kahneman, 1973). Hence, different foci of attention compete: if one area gains attention, another area loses it (Sullivan, 2010). When considering the likelihood of shared facility formation, the attention-based view proposes that it is necessary that attention should be related to this strategic action (Ocasio, 1997). Thus, organizations that focus more on internal operations are unlikely to focus more attention on shared facility formation. In sum, we propose the following hypothesis.

H1: When it experiences negative attainment discrepancy, an organization whose attention is focused on its internal operations will be less likely to form a shared facility through an IOR.

Given our interest in shared facility formation through IORs, one element in the external environment to which the organization can pay attention is interorganizational collaboration. Organizations in which managerial attention is focused on interorganizational collaboration will be focused on issues pertaining to interorganizational collaboration, such as their own existing collaborative initiatives and the collaborative efforts of their competitors. More

importantly, the types of alternatives that are considered in the possible set are driven by the attention of the decision-maker (Barreto, 2012). Therefore, organizations with greater attention to interorganizational collaboration will most likely have interorganizational collaboration in their available repertoire of action alternatives, and this alternative will also be higher in the order of the alternative set (Ocasio, 1997). That is, as the organization encounters a problem and engages in search behavior to solve the problem, interorganizational collaboration will likely be (at least) considered as a solution (Cyert & March, 1992).

H2: When it experiences negative attainment discrepancy, an organization whose attention is focused on interorganizational collaboration will be more likely to form a shared facility through an IOR.

Attention can also be paid to issues in the external environment that are non-collaborative in nature. These can be issues pertaining either to similar organizations or to other forms of organizations (e.g., NGOs, national government). Decision-makers who focus their attention on the non-collaboration issues of similar organizations will more likely come up with a list of alternatives that relate to these similar organizations. As they frequently attend to similar organizations, they are able to garner more information on them (Daft, Sormunen, & Parks, 1988; Sutcliffe, 1994). Such scanning behavior has important benefits, including becoming aware of and understanding the changes occurring within the environment (Hambrick, 1982). It can also help the organization to plan its strategic moves in retaliation to competitor moves or to exploit competitors' weaknesses. However, in our specific setting, different

mechanisms are at play because the different water authorities are not competitors.

In this setting, organizations attending to their peers can become more aware of the potential problems of other organizations. This allows them to compare the situations of those other organizations with their own situations. The decision-makers of the focal organization may realize that they could mutually tackle the problem by jointly developing a shared facility. Therefore, shared facility formation in response to negative attainment discrepancy is more likely when organizational attention is more focused on similar organizations.

H3: When it experiences negative attainment discrepancy, an organization whose attention is focused on similar organizations will be more likely to form a shared facility through an IOR.

Last, organizations can also pay attention to other forms of organizations, including not only suppliers but also NGOs or the national government. Similarly to the rationale behind the first hypothesis, decision-makers are selective in their attention (Ocasio, 2011). The more decision-makers attend to the non-collaborative issues facing other forms of organizations, the less they can notice and act on other issues (Kahneman, 1973; Sullivan, 2010). For a strategic action to be executed, it is necessary that attention should be related to this strategic action (Ocasio, 1997). Yet, attending to the non-collaborative issues of different organizations is likely not to include the option of shared facility formation.

In principle, it is possible to form shared facilities with some alternate forms of organizations, such as suppliers. However, on the whole, shared facilities imply that the

organizations are performing the same activity, which, similar to scale joint ventures, is less likely to occur between different forms of organizations (Hennart, 1988). Thus, when organizations attend to issues that are unlikely to pertain to shared facility formation, shared facility formation is unlikely to occur (Ocasio, 1997; Sullivan, 2010). In conclusion, we propose the following hypothesis:

> *H4: When it experiences negative attainment discrepancy, an organization whose attention is focused on other forms of organizations in the external environment will be less likely to form a shared facility through an IOR.*

Although each attention category stands to impact the organizational change decision, different foci are likely to co-exist. That is, there may be competing foci of attention that direct the search process in opposite directions. For instance, an organization whose attention is on both internal operations and interorganizational collaboration may explore options for solving its negative attainment problem by increasing in-house activity performance. However, it may also explore ways of resolving the issue collaboratively. In such a case, the most satisfactory option will be chosen; however, attention alone is unable to account for this choice.[23] Nevertheless, in our analyses, we will consider the effects of simultaneous foci of attention.

[23] Given this, we are unable to construct *ex ante* hypotheses when two competing foci of attention are equally prevalent in an organization.

Methodology

Research setting

We study our research question in the context of shared facility formation – through IORs – among Dutch water authorities. Water authorities are not to be confused with water utilities (Van den Oever & Martin, 2015). Water authorities are public organizations whose primary activities entail the integral management of water (flood) barriers, water levels, and quality in waterways, as well as urban sewage treatment in their respective regions. They perform a crucial task because the Netherlands has a complicated system of drainage ditches, canals, and pumping stations, which serve to keep the low-lying parts of the country dry for habitation and agriculture. Water authorities have been in existence since the twelfth century and constitute one of the oldest forms of local authority in the country, having been vested in the Dutch constitution since 1848 (Van den Oever & Martin, 2015).

As of 2016, there were 22 water authorities in the Netherlands. Their boards of directors are chosen via public election every four years. Of these directors, five also typically make up the top management team (excluding the chair, who is appointed by the Crown). Water authorities represent a separate level of public governance, and thus they levy their own taxes. Unlike other more general government authorities, the water authorities are considered functional bodies whose remit is limited to public water management. Facing increased pressure to demonstrate and improve their legitimacy and cost efficiency (Van den Oever & Martin, 2015), water authorities are increasingly engaging in interorganizational collaboration.

For two reasons, water authorities offer an excellent arena in which to assess the aforementioned research question. First, as public organizations, they are likely to abide by the behavioral theory's assumption on satisficing behavior. Although the behavioral theory of the

firm was originally developed with business firms in mind, research has shown that it can also be applied to public organizations (e.g. Jones, 2003; Manns & March, 1978; Salge, 2011).

Second, the aspirations of water authorities can be measured particularly clearly. Their annual reports (which include budgets) are publicly available and follow a highly detailed and consistent format. This makes it possible to adequately compare budgets across organizations. We follow previous research in using budgets to measure aspiration levels (Bromiley & Harris, 2014). Using budgets is advantageous over the traditional way of measuring aspiration levels (via "performance") because the net costs as reported in the budget are more observable and verifiable (Blettner, He, Hu, & Bettis, 2015). Indeed, in their annual accounts, our sample organizations juxtapose their performance with their budgeted performance, further showing that the budget entails an aspiration level.

We focus specifically on each organization's decision to enter or form an IOR with another water authority (or group of water authorities), vs. keep its activity in-house. We study two different activities for which each water authority may form IORs: taxation and laboratory activities. Both cases entail a change in the governance regime of existing activities. Whereas these activities were previously held in-house, under an IOR, they will be governed by a separate entity, which will manage the activities for two or more water authorities. Studying these decisions is especially relevant to test our hypotheses, for two reasons.

First, the water authorities have only two governance options: in-house or allying with other water authorities. Water authorities are legally bound to execute both tax and laboratory activities (where laboratory activities involve monitoring water quality). These organizations do not have the option to refrain from executing these activities; they cannot make acquisitions; and they cannot outsource to a non-water authority. Thus, their set of alternatives is restricted to in-

house production or allying horizontally.

Second, in water authorities, top management is specifically tasked with making these IOR decisions; such decisions are not delegated to subunits as can happen in diversified firms. Thus, we can adequately apply organizational-level performance measures and organizational attention. In sum, focusing on the IOR decisions of these organizations helps us to tease out the effects of attention on the type of decision made, theoretically as well as empirically.

Data collection

Our unit of analysis is the IOR formation initiative for one of the two activities in a given year. We use a variety of archival resources that include seven years of data on 27 water authorities, from 2008 to 2014.[24] For each water authority, we collected the (confidential) minutes and lists of decisions of all top management and board of director meetings, as well as all annual reports. The sample of this study consists of two activities (taxation and laboratory) of 27 water authorities over a period of up to seven years. In total, the sample comprises 346 observations.[25]

Data for this study were collected from each water authority. To measure performance, aspiration level, and control variables, we gathered annual reports from the Dutch Chamber of Commerce website. To measure organizational attention, the literature has mainly used observable demographics of the top management team, surveys, interviews, case studies, or letters of shareholders; however, each of these approaches raises concerns regarding internal and external validity (Surroca, Prior, & Tribó Giné, 2016). Instead, we gathered another set of data directly from each organization: minutes and decision lists of the meetings of the 'board of directors', 'top management team', and other any committees involved (consulted) in decision-

[24] A large number of mergers occurred before 2008 in the water authority sector. Because we manually collected the data at each water authority, extending the time period to before 2008 would have greatly challenged the organizations' memories. To also ensure their cooperation, we chose not to go back earlier than 2008.

[25] Because a few mergers occurred between 2008 and 2014, the number of observations is slightly lower than 2*27*7. We also had missing data for four observations.

making. Given that the minutes of the top management team are confidential and designed for internal purposes, we are confident that these minutes adequately reflect organizational attention. After removing duplicates (decision list and minutes of the same meeting) the total number of documents is 7,680. Table 1 presents the number and type of documents per year.

Table 1
Count of different types of internal documents

		2008	2009	2010	2011	2012	2013	2014	Total
Minutes	BoD	184	209	176	168	152	148	137	1,174
	TMT	299	267	256	266	275	251	178	1,792
	Committees	300	256	258	243	260	250	241	1,808
Decision lists	BoD	10	24	34	35	34	47	43	227
	TMT	291	344	341	322	343	375	426	2,442
	Committees	40	28	23	28	31	36	51	237

To gain an adequate understanding of how decisions are actually made, we collected qualitative data on the IOR formation decisions of two organizations in our sample. We gathered archival documents and interviewed middle managers involved in the decision-making process. These data also helped us to interpret the minutes adequately. Judging from this, we are confident that the IORs we studied were formed to reduce costs. For instance, the archival documents frequently mention costs as an important motive of forming an IOR. Regarding laboratory activity,

> *[The new laboratory IOR] will also result in further savings of public resources. With the collaboration of [water authority X and Y], there will be a leap in scale, which will provide, in addition to the savings that are already covered in the*

2011-2015 budget of [the laboratory IOR], a structural saving benefit of approximately [X amount of euros] annually.

For the taxation activity, costs are also frequently mentioned in relation to IOR formation:

Water authorities feel socially responsible and want to perform their responsibilities as well and as cheaply as possible for the public. The public also has the right to inspect the performance of the water authorities. It is clear that coordination and cooperation with third parties for the proper execution of the tasks of the water authority are becoming more important. This also applies to the way the water authorities organize the taxation and levying of their taxes.

Our interviews further support these excerpts. When discussing why costs were frequently mentioned in the archival documents, one middle manager commented:

That is something that is tangible. You can measure it directly or you can make it measurable.

Topic modeling

To measure organizational attention, we used a relatively new technique called topic modeling (Kaplan & Vakili, 2015; Wilson & Joseph, 2015). In political science, this technique has been applied to the study of political attention (Grimmer, 2010, 2013; Quinn et al., 2010). Applying this method to the minutes of the decision-maker meetings is an appropriate way to measure organizational attention because we can directly infer which overall topics were discussed in these meetings. In topic modeling, the co-location of words in a collection of documents (i.e., a corpus) can be used to infer the latent topics in those documents. As words co-occur more often together within a document and these co-occurrence patterns are shared between the documents, these words will center on a topic. The general assumption behind topic modeling is that topics

are specified before the documents are written (Blei, 2012). For writers, the choice of a topic serves as a basis for their selection of the words they use in the document. Therefore, by observing the words that are used within a document, one can derive the topic that characterizes the document.

In contrast to the second essay, for this essay it is much more difficult to create an appropriate dictionary for the construct of interest, i.e., attention. This makes word count analysis an inferior approach. Instead, topic modeling is more appropriate in this essay, as the overall change in the use of words reflects a change in attention (Duriau et al., 2007). Hence, attention can and should be captured by considering the full text, not just the use of certain words as specified in a dictionary.

Topic modeling also holds important advantages over human-coded techniques. First and foremost, topic modeling is a more reliable and cost-effective method compared to human-coded techniques. Human-coded techniques also assume that the substance of topics and the rules of coding documents are known a priori (Quinn et al., 2010). One advantage of human-coded techniques is that the coding scheme used for text in documents can be highly sophisticated and contingent, increasing the validity of the study. Yet, especially when considering a large set of documents, the use of multiple coders becomes necessary, making it difficult to track whether (1) the same rules are used by the coders and (2) the coders use adequate rules to capture the constructs to be studied. Hence, provided that we as researchers are also boundedly rational, human-coded techniques may be superior when the amount of text to be studied is low, but computer-aided text analyses become superior as the amount of text increases. Another strength is that content analysis allows rendering the rich meaning of organizational documents in combination with quantitative analysis, which purely quantitative or qualitative approaches lack

(Duriau et al., 2007).

A first step in topic modeling is to clean the corpus by removing specific words, numbers, punctuation and whitespace, and by transforming upper case letters to lower case letters (Grimmer, 2010).[26] The words that are removed include various stop words (e.g., and, or) as well as specific words that do not constitute a specific topic per se.[27] For instance, our collected documents include such words as minutes, decision list, page number, meeting, decision, which appear in nearly all documents but do not add any meaningful topics.

Another problem we encountered was related to specific names of locations, projects, municipalities, and collaboration initiatives. Including these names would mean that topics would center on specific organizations, and thus the results of the topic model would not reflect granular accounts of organizational attention. Excluding these names would also be faulty, as they relate to internal operations (e.g., for project names) and the external environment (e.g., for municipality names). As a compromise, we chose to change the names of the projects into the word [projectname], the names of municipalities into the word [municipalityname], and so on.[28]

Following these changes to the corpus, we removed all words that occurred fewer than 40 times in the corpus, so as to reduce the noise in the analysis while eliminating words with unique typos (Grimmer, 2010; Levy & Franklin, 2014). To further support this effort, we removed words that did not occur in at least 10 (0.0125%) of the documents. The resulting final corpus allowed us to create a document-term matrix. In this matrix, the rows correspond to the documents in the collection and the columns correspond to the unique words that are used in the corpus. We ran our model using the Bayesian statistical technique of latent Dirichlet allocation

[26] Although it is a common procedure for topic modeling, we intentionally did not stem the words in our corpus. In Dutch, words belonging to the same stem can actually have subtly different meanings.
[27] The full list is available upon request.
[28] The full list is available upon request.

(Blei, Ng, & Jordan, 2003). We limited the model to 40 topics.[29]

Per topic, we observed the 10 most common words and assessed each word *individually* to determine which general topic it should be ascribed to. To do this, for each word, we looked at the paragraphs in which the word was mentioned in a random subset of documents, which improved semantic validity (Quinn et al., 2010). A large subset of words could be easily ascribed to a general topic (e.g., elections). When the interpretation of the word would be different across paragraphs in the random subset we studied, we left the interpretation open. Next, we began labeling topics by looking at the 10 most common words per topic *simultaneously* and thus assessed the general subject per topic. We labeled these topics by distinguishing among general categories: projects, internal organization, similar organizations in the external environment, different organizations in the external environment, interorganizational collaboration, budget, strategy, operations, and elections. In total, we had 11 topics that related to projects, 4 to internal organization, 3 to similar organizations (i.e., other water authorities) in the external environment, 4 to different organizations (i.e., non-water authorities) in the external environment, 3 to interorganizational collaboration, 8 to budget, 1 to strategy, 5 to operations, and 1 to elections. The outcome of this process served as input to our organizational attention variables, to which we will return after discussing our operationalization of the dependent variable.

Dependent variable

IOR formation ($IORFor_{i,j,t}$). The dependent variable in this study is the event of the formation of a new IOR of water authority *i*'s activity *j* at time *t*. We infer this event from the lists of decisions made by top management and annual reports. We checked whether these lists mentioned

[29] There are not strict guidelines for the selection of the number of topics. We chose 40 topics, as selecting fewer resulted in topics that reflected vague attention items (e.g. municipalities, projects, budgets in general). Selecting more topics was also problematic as topics became overlapping (e.g. difference between topics constituted one or two words). Our approach is consistent with the literature in political science (Quinn et al., 2010).

interorganizational collaboration pertaining to these activities and coded this variable 1 when the decision was made to form an IOR for activity *j*.

Independent variables

Organizational attention to internal operations ($AttInt_{i,t}$). This is a continuous variable that is bounded between 0 and 1. We start by counting the number of topics that reflect internal operations; these topics included projects, internal organization, and operations. We then calculate the number of documents that are assigned with those particular topics per organization *i* in year *t*. Topics were assigned to a particular document if the topic loaded at least 20% on that document. We divide this number by the total number of topics of that organization *i* in year *t.* [30]

Organizational attention to interorganizational collaboration ($AttInterColl_{i,t}$). To measure organizational attention to interorganizational collaboration, we used a similar procedure. The difference is that we count the number of topics that reflect interorganizational collaboration instead of the internal operations.

Organizational attention to similar organizations ($AttSim_{i,t}$). To measure organizational attention to similar organizations, we count the number of topics that reflect attention to other water authorities.

Organizational attention to other forms of organizations ($AttDiff_{i,t}$). To measure organizational attention to other forms of organizations, we count the number of topics that reflect attention to external organizations other than water authorities.

Negative attainment discrepancy ($NAD_{i,t}$). Aspirations were measured as the net costs per organization *i* per year *t.* The net costs are the costs that are ascribed to the primary activities of the water authority and on which the revenues (not including taxes and other general revenues)

[30] We chose not to lag this variable since the attention of the decision-maker matters at the moment the decision is being made.

are subtracted.[31] In the selection of this performance measure, we chose to diverge from prior literature, as our organizations are governmental and are not primarily driven by a profit motive. Rather, they focus on costs because running above the budgeted costs will force the organization to increase its primary source of revenues: taxes. This is undesirable for the decision-makers involved because raising taxes may cost them their positions in future elections. The public administration literature frequently uses efficiency- or cost-based measures of the performance of public organizations (e.g. Andrews, Boyne, & Walker, 2011; Brewer & Selden, 2000; Neshkova & Guo, 2012).

In the literature, a common way to measure aspiration level is to take the average of the firm's performance in prior years (historical aspiration) and/or the average of the performance of similar organizations (social aspiration). Although past and peers' performance can help the organization set its aspiration level, there are important issues associated with these measures. For both historical and social aspiration levels, one issue is that they may not be adequate benchmarks for the organization's performance for the following year. The organization may know of recent advancements or about important events that may occur in the next year. For instance, an organization may know that it will sell off one of its activities in the next year, which will have important consequences for its performance that year. Setting an aspiration level based on the organization's historical performance would thus be problematic. Similarly, setting the aspiration level as a simple average of the performance of rivals is also problematic in such situations.

Instead, we argue that the budget will provide a better indicator of a firm's aspiration level. Previous research has equated aspirations with budgets (Bromiley & Harris, 2014). By the end of the year, the organization constructs a plan that includes its costs, its revenues and its

[31] The primary activities are water system management, sewage treatment, and road/canal management.

ultimate performance for the next year. During that year, the organization will frequently benchmark its current performance against its projected performance. When actual performance begins to fall behind what was proposed in the budget (negative attainment discrepancy), the organization will become more likely to engage in decision-making.

Decision-makers use information regarding prior years' performance and similar organizations' performance (among other types of information) to construct their budgets. Specifically, using historical aspirations and social aspirations may be faulty, given that decision-makers place different emphases on this information depending on organizational age (Blettner et al., 2015), and simply using historical aspirations or social aspirations would not account for this.

Hence, for the construction of the negative attainment discrepancy measure, we use the budget data from the annual report of the water authorities. Here, attainment discrepancy is measured by $NAD_{i,t} = \left| {A_{i,t} - P_{i,t}}/{A_{i,t}} \right|$, where $A_{i,t}$ denotes the aspiration level in terms of the net costs of water authority *i* at time *t*, and $P_{i,t}$ denotes performance in terms of the net costs of water authority *i* at time *t.* For each observation where performance is higher than aspiration level, we set this variable to 0. A more positive value denotes higher negative attainment discrepancy.

Control variables

In total, we include 13 control variables. First, we control for the number of topics discussed per organization per year. This is to control for the attention span of the organization.

Second, to control for activity-specific fixed effects, we include a dummy variable for taxation activity. Laboratory activity was treated as the baseline.

Third, we control for a direct effect of slack resources, as organizations with slack

resources may be seen as attractive partners, thus increasing the likelihood that they will form an IOR. Following George (2005), we used the level of cash reserves of water authority *i* at time *t* to measure slack resources. Cash is the most easily deployed resource and is, as such, an ideal measure of slack resources (George, 2005). Given the non-normal distribution of this variable, we took its cube root.

Fourth, we control for an interaction effect of slack resources and negative attainment discrepancy, consistent with earlier studies that have found said effect to influence IOR formation behavior (Tyler & Caner, 2016).

Fifth, we control for a direct effect of the organization *i* already being in an IOR on activity *j* at time *t.* In an IOR, relation-specific investments can contribute to the performance of the organizations involved (Dyer & Singh, 1998); however, these investments are also limited in their recoverability. Thus, even though IOR performance may be unsatisfactory, organizations may stick with the current IOR because they have already incurred substantial sunk costs.

Sixth, we measure the number of existing collaborations by counting the number of entities in which the organization had decision-making rights or a financial stake. We include this variable as a proxy for IOR experience. Organizations can develop capabilities that accrue as a result of historical processes of learning, which is especially important because partnering is difficult (Gulati, 1999; Powell, Koput, & Smith-Doerr, 1996).

Seventh, we measure the total number of IOR formations for both activities over the past years by taking the sum of the IOR formation variable for all the years before *t.* This variable also serves as a proxy for IOR experience.

Eighth, for each organization *i* for activity *j* at time *t,* we include a variable counting the number of times the focal organization engaged in an IOR for the other activity in that given year

t. This variable is included to account for any year-specific factors that may influence the general tendency of the organization to form an IOR.

Ninth, we measure the number of municipalities that overlap with the region of the water authority because this can drive the organizational experience with interorganizational collaboration (as water authorities regularly collaborate with municipalities).

Tenth, we include a count of the total number of organizations that are geographical neighbors of organization *i* at time *t* because organizations with a greater number of neighbors may more easily form an IOR given their increased number of opportunities to do so. Geographical proximity has been found to be an indicator for IOR partner selection because it facilitates knowledge transfer (Rosenkopf & Almeida, 2003). Indeed, the general tendency in this industry is for organizations to form IORs with geographically proximate organizations, thus, we account for the fact that some organizations may be better positioned for IOR formation.

Eleventh, we include a continuous variable indicating the count of geographically neighboring organizations of organization *i* that form an IOR for activity *j* at time *t* divided by the total number of neighboring organizations of organization *i*. We include this variable because the focal organization has an ideal opportunity to enter an IOR if its neighbors are forming an IOR.

Twelfth, we control for the number of neighboring organizations of organization *i* that are in a different IOR than organization *i* for activity *j* at time *t.* Because organizations tend to form IORs with geographically proximate organizations (Rosenkopf & Almeida, 2003), if other proximate organizations have already entered an IOR, there will be fewer opportunities – and more obstacles – for the organization to enter an IOR.

Thirteenth, we count the number of organizations – other than the focal organization – with negative attainment discrepancy *i* at time *t.* If more organizations face negative attainment discrepancy in a given year, this makes it easier for an organization to form an IOR because these other organizations are also motivated to form an IOR.

Analysis

We employ an event history analysis to test our hypotheses. In this paper, the event is the formation of an IOR for activity *j* by organization *i*. In traditional event history analyses, the observation (here the organization) is removed from the dataset when the event occurs. Yet, an organization can form and replace its IOR in other periods. Because the underlying time process in the data is inherently continuous, we use a non-parameterized event history model: the Cox's proportional hazard model (Box-Steffensmeier & Jones, 2004). Right censoring, caused by truncating the observation period at 2014, is routinely and robustly handled within event history analysis (Tuma & Hannan, 1984). Left censoring is present to some extent because some organizations had formed IORs before the start of the sample (mostly in 2007). Moreover, to account for dependencies between failure times, the effects of the covariates on the hazard rate were estimated using the Efron (1977) partial likelihood approximation method.

One of the most important sources of estimation bias in Cox's proportional hazard models is the violation of the proportional hazard assumption. This assumption means "that the hazards of two units experiencing an event are proportional to one another and that this relationship is constant over time" (Gandrud, 2015: 3). We test this violation via post estimation procedures and find that the assumption is not violated for our variables of interest ($p > 0.10$), except for the interaction term between negative attainment discrepancy and attention to interorganizational collaboration ($p = 0.000$). To remedy this violation, we run an additional model in which we interact the interaction term between negative attainment discrepancy and attention to interorganizational collaboration with a time indicator, and the results are similar to the model without the interaction term with time. As such, we use the model without the interaction term with time to test our hypotheses.

Results

As an introduction to the results, Table 2 shows the mean, standard deviation, minimum and maximum of each variable. Table 3 provides the matrix of correlations among all variables. We checked multicollinearity and the distribution of the independent variables. Multicollinearity did not seem to be an issue as all VIF scores were lower than 10.

Table 2
Descriptive statistics

Table 2. Descriptive statistics (n = 346)

Variable	Mean	S.D.	Min	Max
IOR formation	0.13	0.33	0	1
AttInt	0.5	0.25	0.01	0.95
AttInterColl	0.06	0.06	0	0.3
AttSim	0.13	0.21	0	0.73
AttDiff	0.15	0.20	0	0.81
NAD	1.18	3.73	0	33.96
NoTopics	11.21	2.97	4	22
TAX	0.5	0.5	0	1
Slack	65.68	68.98	0	334.17
InIOR	0.64	0.48	0	1
Current collaborations	6.98	3.12	1	20
Total no. of IOR form	1.17	0.92	0	4
IOR form for other activity	0.2	0.4	0	1
Number of municipalities in region	20.75	9.06	3	45
Total number of neighbors	4.26	1.51	1	8
Neighbors forming an IOR	0.21	0.33	0	1
Neighbors in a different IOR	0.45	0.3	0	1
Other organizations with NAD	5.63	2.47	2	9

Table 3
Correlation matrix

Table 3. Correlation matrix (n =346)

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	IOR formation	1																	
2	AttInt	-0.04	1																
3	AttInterColl	0.03	-0.08	1															
4	AttSim	-0.01	-0.59	0.03	1														
5	AttDiff	0.03	-0.52	-0.18	-0.16	1													
6	NAD	0.05	-0.00	-0.07	-0.04	0.02	1												
7	NoTopics	0.01	0.19	0.30	0.02	-0.38	-0.07	1											
8	TAX	0.07	0.00	0.00	0.00	-0.00	0.00	0.00	1										
9	Slack	-0.03	0.04	-0.13	0.12	-0.11	0.07	-0.00	0.00	1									
10	InIOR	-0.07	-0.12	0.24	0.09	0.05	-0.04	-0.11	-0.04	-0.10	1								
11	Current collaborations	0.06	0.02	-0.11	0.35	-0.35	0.08	-0.04	0.00	0.04	0.05	1							
12	Total no. of IOR form	-0.08	-0.06	0.08	0.06	0.06	-0.03	-0.06	-0.30	-0.05	0.45	0.04	1						
13	IOR form for other activity	0.02	-0.03	0.00	-0.03	0.05	0.08	0.08	0.00	0.04	-0.19	-0.10	-0.16	1					
14	Number of municipalities in region	-0.03	-0.17	-0.12	0.36	-0.15	-0.01	-0.01	0.00	0.16	-0.12	0.17	-0.13	-0.07	1				
15	Total number of neighbors	0.10	-0.07	-0.19	0.32	-0.03	-0.12	-0.05	0.00	-0.02	0.15	0.10	0.10	0.08	0.11	1			
16	Neighbors forming an IOR	0.47	-0.03	-0.05	0.01	0.03	-0.03	0.05	0.03	0.03	-0.34	-0.13	-0.22	0.26	0.01	0.04	1		
17	Neighbors in a different IOR	-0.12	0.13	-0.33	-0.04	-0.05	-0.05	-0.08	0.17	-0.01	-0.22	-0.02	-0.24	-0.01	0.26	0.19	-0.01	1	
18	Other organizations with NAD	0.20	-0.04	0.00	-0.01	0.04	-0.03	0.05	0.00	0.07	-0.23	-0.05	-0.20	0.31	-0.01	-0.01	0.52	-0.03	1

Table 4 presents the results of the Cox event history analysis. Model 1 includes all control variables. Model 2 includes, on top of the control variables, an interaction between attention to the internal environment and negative attainment discrepancy to test the first hypothesis. Model 3 reports on a test for the second hypothesis, where, on top of the control variables, we include the interaction term between attention to interorganizational collaboration and negative attainment discrepancy. Model 4 includes all control variables and an interaction between attention to similar organizations and negative attainment discrepancy. In model 5, we include all control variables and an interaction between attention to other forms of organizations and negative attainment discrepancy. Finally, model 6 includes all variables. The improved log likelihood for the full model shows that the full model has a superior model fit compared with the other models. Interpretation of the results will be on the basis of the full model (6) unless stated otherwise.[32]

Hypothesis 1 predicted a moderation effect of negative attainment discrepancy on organizational attention to the internal operations effect on IOR formation. Our model supports this hypothesis with a p-value of 0.001. Assessing the marginal effect of interaction terms in non-linear models is difficult because the interaction term does not represent a cross-partial derivative as it does in linear models (Hoetker, 2007). To assess these marginal effects, we use the simulation-based approach of King, Tomz, and Wittenberg (2000) as adapted for Cox event history analyses (Gandrud, 2015). This approach simulates the regression coefficients, in our case 1,000 times, assuming they are normally distributed (King et al., 2000).

[32] Although the signs of the main variables of interest change when including all variables in this full model, we report on the final model only. Given that different foci of attention may be present simultaneously, it is important to consider all interactions when analyzing the main variables of interest.

Table 4

Cox event history model results

Model (n = 346)	1		2		3		4		5		6	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
AttInt*NAD (H1 -)			-0.148	0.208							-1.492	0.001
			(0.117)								(0.457)	
AttInterColl*NAD (H2 +)					3.272	0.001					3.918	0.000
					(1.028)						(1.071)	
AttSim*NAD (H3 +)							0.041	0.935			-0.709	0.366
							(0.503)				(0.785)	
AttDiff*NAD (H4 -)									0.081	0.452	-1.120	0.014
									(0.107)		(0.455)	
AttInt	-2.242	0.080	-2.254	0.079	-2.745	0.036	-2.252	0.077	-2.269	0.082	-2.729	0.037
	(1.282)		(1.282)		(1.309)		(1.274)		(1.305)		(1.312)	
AttInterColl	-2.546	0.246	2.351	0.238	0.842	0.713	2.336	0.249	2.329	0.243	0.548	0.812
	(1.368)		(1.992)		(2.291)		(2.028)		(1.995)		(2.310)	
AttSim	-4.167	0.002	-4.354	0.002	-4.906	0.001	-4.194	0.002	-4.278	0.003	-5.204	0.001
	(1.368)		(1.396)		(1.510)		(1.360)		(1.427)		(1.527)	
AttDiff	-1.868	0.095	-2.118	0.078	-2.620	0.041	-1.874	0.093	-2.047	0.097	-2.833	0.031
	(1.120)		(1.200)		(1.284)		(1.115)		(1.232)		(1.312)	
NAD	-0.075	0.236	0.003	0.970	-0.358	0.000	-0.076	0.232	-0.086	0.203	0.494	0.033
	(0.064)		(0.071)		(0.101)		(0.063)		(0.067)		(0.232)	
Slack	-0.002	0.406	-0.003	0.391	-0.003	0.370	-0.002	0.386	-0.002	0.407	-0.003	0.265
	(0.003)		(0.003)		(0.003)		(0.003)		(0.003)		(0.003)	
NAD*Slack	0.002	0.003	0.002	0.000	0.003	0.001	0.002	0.002	0.002	0.000	0.004	0.000
	(0.001)		(0.001)		(0.001)		(0.001)		(0.001)		(0.001)	
NoTopics	-0.014	0.005	-0.021	0.755	-0.022	0.737	-0.13	0.841	-0.120	0.772	-0.022	0.735
	(0.069)		(0.068)		(0.064)		(0.067)		(0.068)		(0.064)	
Tax	0.986	0.842	1.044	0.03	0.991	0.001	0.987	0.005	1.025	0.003	1.067	0.001
	(0.350)		(0.349)		(0.311)		(0.351)		(0.341)		(0.323)	
InIOR	-0.389	0.471	-0.380	0.503	-0.151	0.818	-0.388	0.472	-0.387	0.489	-0.096	0.884
	(0.540)		(0.568)		(0.657)		(0.540)		(0.559)		(0.662)	
Current collaborations	0.132	0.026	0.133	0.026	0.133	0.340	0.132	0.28	0.133	0.024	0.138	0.033
	(0.059)		(0.060)		(0.063)		(0.060)		(0.059)		(0.065)	
Total no. of IOR form	-0.606	0.092	-0.626	0.092	-0.711	0.083	-0.606	0.092	-0.621	0.094	-0.721	0.082
	(0.359)		(0.372)		(0.409)		(0.360)		(0.371)		(0.415)	
IOR form for other activity	-0.357	0.181	-0.361	0.169	-0.396	0.143	-0.358	0.179	-0.354	0.179	-0.410	0.117
	(0.267)		(0.262)		(0.271)		(0.267)		(0.264)		(0.262)	
No. of municipalities in region	0.006	0.658	0.009	0.501	0.004	0.744	0.006	0.662	0.008	0.571	0.007	0.621
	(0.013)		(0.14)		(0.14)		(0.13)		(0.14)		(0.014)	
Total number of neighbors	0.550	0.000	0.572	0.000	0.591	0.000	0.551	0.000	0.563	0.000	0.618	0.000
	(0.107)		(0.110)		(0.105)		(0.109)		(0.108)		(0.109)	
Neighbors forming an IOR	3.605	0.000	3.694	0.000	3.630	0.000	3.609	0.000	3.658	0.000	3.794	0.000
	(0.693)		(0.722)		(0.628)		(0.695)		(0.713)		(0.700)	
Neighbors in a different IOR	-1.741	0.012	-1.853	0.010	-1.838	0.009	-1.739	0.012	-1.826	0.011	-1.897	0.008
	(0.694)		(0.723)		(0.700)		(0.689)		(0.720)		(0.720)	
Other organizations with NAD	-0.437	0.326	-0.435	0.329	-0.452	0.303	-0.437	0.322	-0.429	0.329	-0.495	0.248
	(0.444)		(0.446)		(0.439)		(0.442)		(0.439)		(0.429)	
Log likelihood	-126.328		-126.172		-124.563		-126.327		-126.264		-123.950	

Notes: N = 346. Standard errors are in parentheses.

Figure 1 depicts the moderation effect.[33] The line depicts the marginal effect of attention to internal operations under different levels of negative attainment discrepancy. The differently shaded area around the line depicts the 95% probability interval of the simulation outcomes. The most transparent area displays the farthest extent of the probability interval. The less transparent area shows the central 50 percent of this interval, and the middle line shows the interval's median. It is clear that, given the attention to internal operations, organizations with low negative attainment discrepancy are more likely to form an IOR than organizations with high negative attainment discrepancy (where the marginal effect of attention to internal operations is lower).

Hypothesis 2 predicted a moderation effect of negative attainment discrepancy on the effect of attention to interorganizational collaboration on IOR formation. The effect is significant with a p-value below 0.001. Figure 2 depicts the moderation effect. In this figure, it is clear that organizations with high negative attainment discrepancy are more likely to form an IOR in response to higher attention to interorganizational collaboration compared with organizations with low negative attainment discrepancy (where the marginal effect of attention to interorganizational collaboration is lower). From this figure, it is visible that, on average, when negative attainment discrepancy increases, the organization becomes more likely to form an IOR when its attention is on interorganizational collaboration.

[33] Note that the negative attainment discrepancy range is truncated to show the interaction effects when negative attainment discrepancy is at mean and approximately at one standard deviation below and above the mean.

Figure 1

Hypothesis 1's interaction between attention to internal operations and negative attainment discrepancy

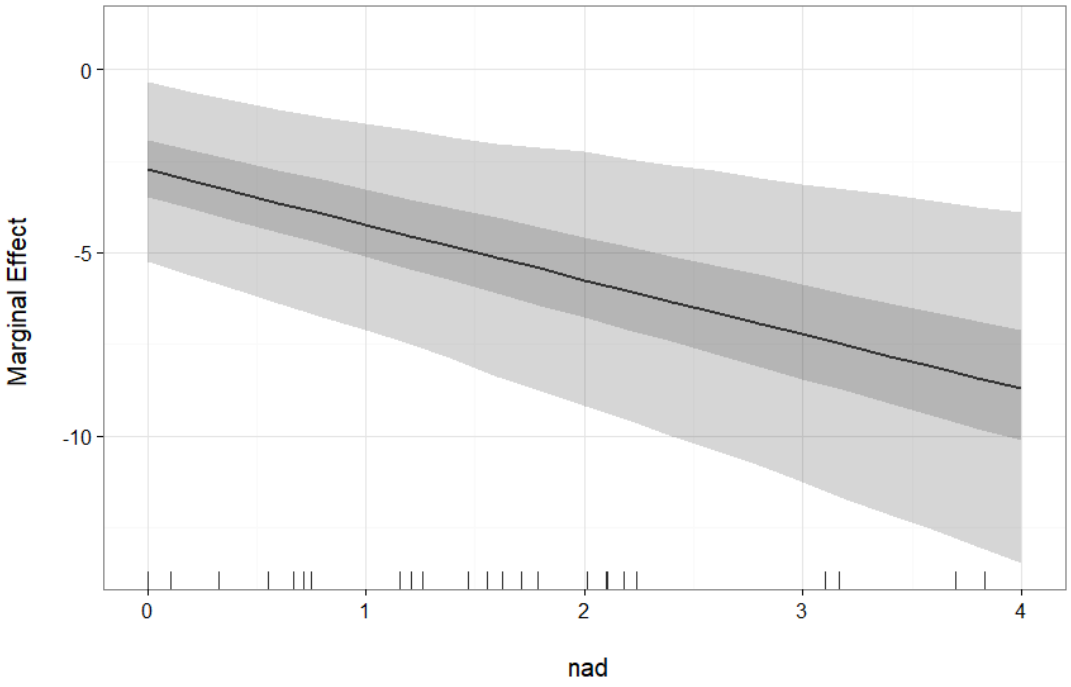
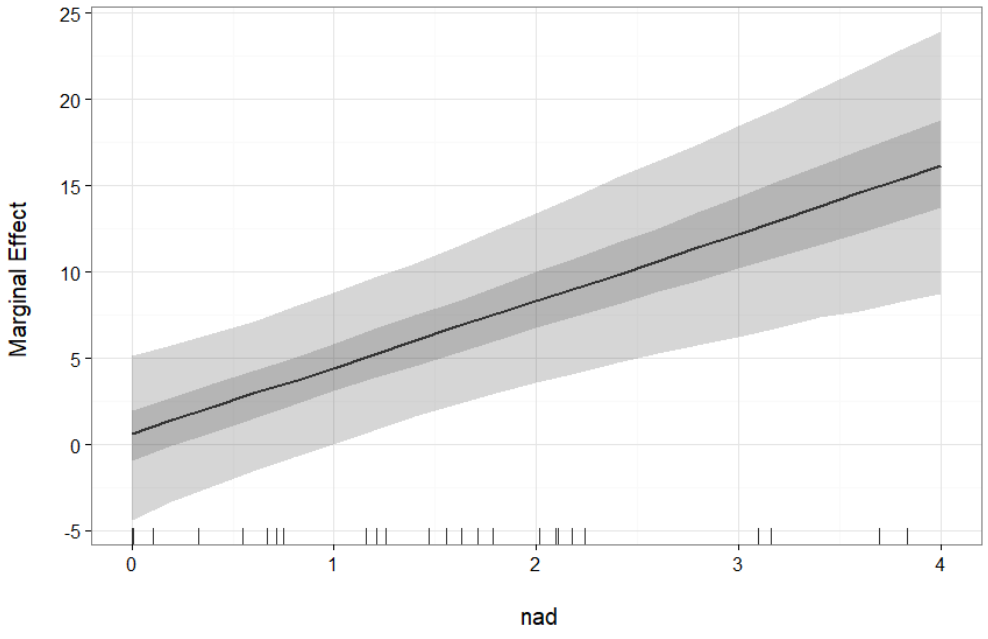


Figure 2

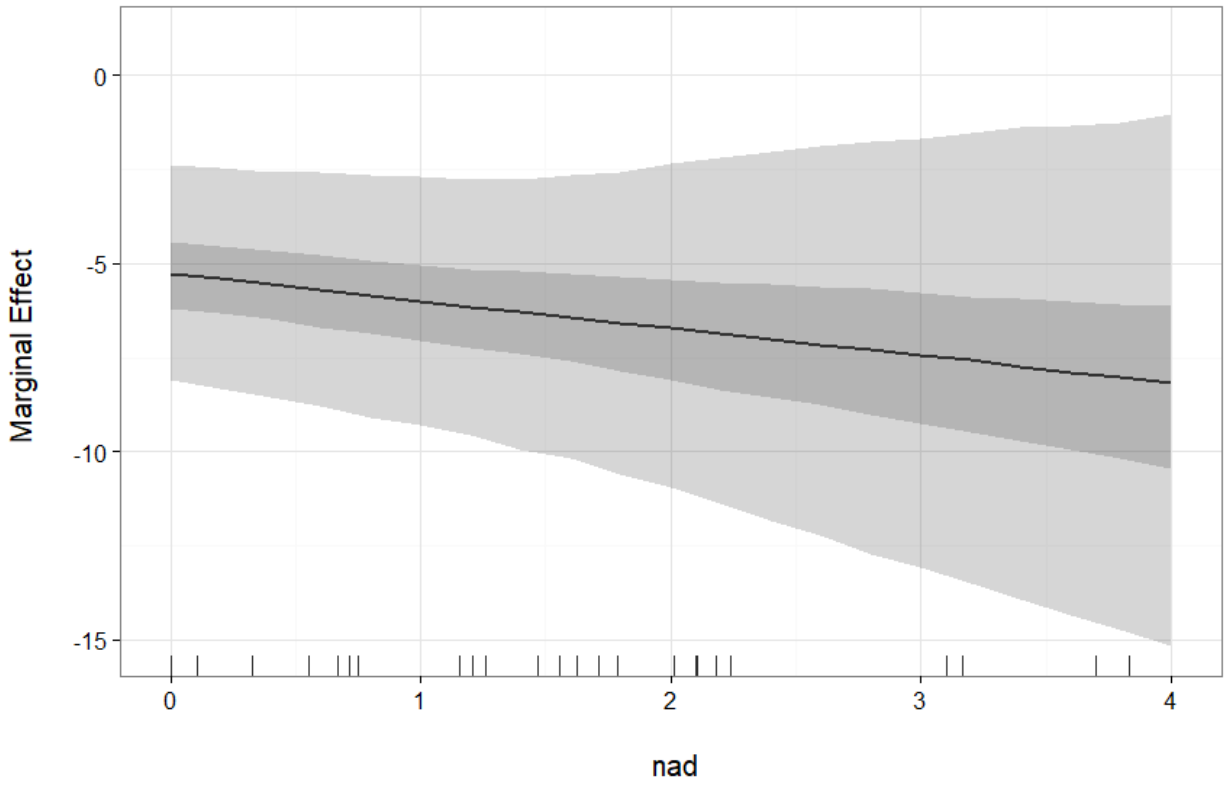
Hypothesis 2's interaction between negative attainment discrepancy and attention to interorganizational collaboration



We proceed to test the moderation effect of negative attainment discrepancy on the attention to similar organizations effect on IOR formation. We fail to find a statistically significant positive effect. Figure 3 provides an illustration of this effect, in which it is visible that we fail to find a significant positive effect (the confidence interval at high negative attainment discrepancy overlaps the confidence interval at low negative attainment discrepancy).

Figure 3

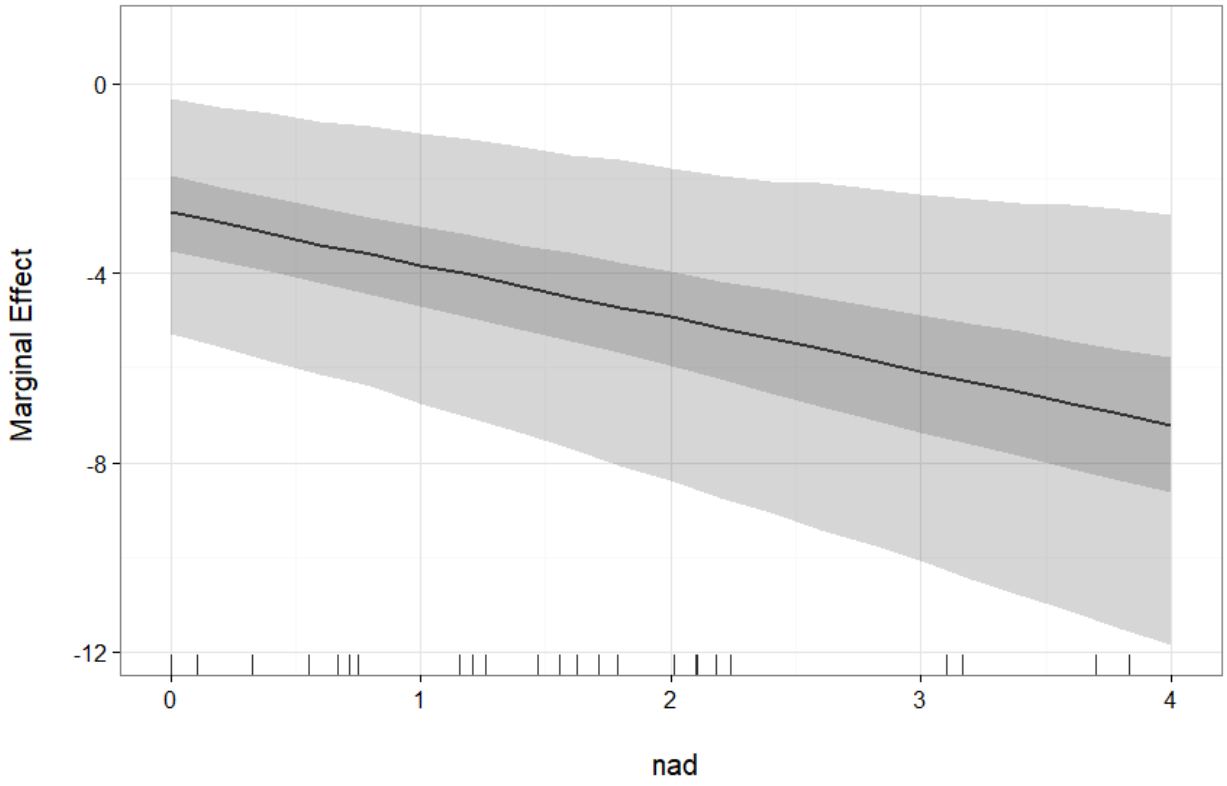
Hypothesis 3's interaction between negative attainment discrepancy and attention to similar organizations



Last, we test the moderation effect of negative attainment discrepancy on the effect of attention to different types of organizations on IOR formation. We indeed find a significant negative effect (p-value = 0.014). Again, we depict the moderation effect in Figure 4. Given this figure, on average, when negative attainment discrepancy increases, the organization becomes less likely to form an IOR when its attention is on different types of organizations.

Figure 4

Hypothesis 4's interaction between negative attainment discrepancy and attention to different organizations



Robustness checks

Because we seek to understand the effects of attention when negative attainment discrepancy is high, we centered negative attainment discrepancy at a low and at a high value (the 5th and 95th percentiles, respectively).[34] In table 5, we report these results. Note that only the direct effects vary when we center negative attainment discrepancy at a low versus a high value; therefore, the values in bold are the relevant effects to consider.

The results are consistent with those reported previously. The effect of attention to internal operations is negative when the organization has low negative attainment discrepancy,

[34] If we do not center the variables, we can only interpret the main effect of attention when keeping other variables constant, including the interaction effect. The interaction effect can only be held constant if one of the terms in it is set at 0. This is done by centering that variable (in our case, negative attainment discrepancy) and by looking at representative values of this moderator (in our case, low vs. high: the 5th and 95th percentiles).

but the effect is stronger when the organization has high negative attainment discrepancy (H1) (the magnitudes are -2.729 and -14.294, and the p-values are 0.037 and 0.001, respectively). This also holds for attention to interorganizational collaboration (H2) (the magnitudes are 0.548 and 30.931, and the p-values are 0.812 and 0.000, respectively), attention to similar organizations (H3) (the magnitudes are -5.204 and -10.7, and the p-values are 0.001 and 0.084, respectively), and attention to different organizations (H4) (the magnitudes are -2.833 and -11.521, and the p-values are 0.031 and 0.004, respectively). This provides support for the fact that attention has a negative main effect when negative attainment discrepancy is high, providing further evidence for the interaction effect.

We also explored the impact of three-way interactions given that different foci of attention can have opposite effects. What is important from these models is that the hypothesized effects generally remain, even when including the different three-way moderation effects.[35] Last, we further discussed these findings with managers in our empirical setting, who confirmed that these organizations generally start to engage in organizational change in response to negative attainment discrepancy. The attention of top management was indeed guiding this search process for the type of organizational change (e.g., solving the problem internally vs. collaboratively). This further corroborates the internal validity of the study.

[35] The results of these tests are available upon request.

Table 5

Cox event history model results when centering independent variables

Model (n = 346)	7		8	
	Coef.	p-value	Coef.	p-value
AttInt*NAD (H1 -)	-1.492	0.001	-1.492	0.001
	(0.457)		(0.457)	
AttInterColl*NAD (H2 +)	3.918	0.000	3.918	0.000
	(1.071)		(1.071)	
AttSim*NAD (H3 +)	-0.709	0.366	-0.709	0.366
	(0.785)		(0.785)	
AttDiff*NAD (H4 -)	-1.120	0.014	-1.120	0.014
	(0.455)		(0.455)	
AttInt	**-2.729**	**0.037**	**-14.294**	**0.001**
	(1.312)		**(4.186)**	
AttInterColl	**0.548**	**0.812**	**30.931**	**0.000**
	(2.310)		**(7.726)**	
AttSim	**-5.204**	**0.001**	**-10.700**	**0.084**
	(1.527)		**(6.189)**	
AttDiff	**-2.833**	**0.031**	**-11.521**	**0.004**
	(1.312)		**(3.998)**	
NAD	0.494	0.033	0.494	0.033
	(0.232)		(0.232)	
Slack	-0.003	0.265	0.026	0.000
	(0.003)		(0.006)	
NAD*Slack	0.004	0.000	0.004	0.000
	(0.001)		(0.001)	
NoTopics	-0.022	0.735	-0.022	0.735
	(0.064)		(0.064)	
Tax	1.067	0.001	1.067	0.001
	(0.323)		(0.323)	
InIOR	-0.096	0.884	-0.096	0.884
	(0.662)		(0.662)	
Current collaborations	0.138	0.033	0.138	0.033
	(0.065)		(0.065)	
Total no. of IOR form	-0.721	0.082	-0.721	0.082
	(0.415)		(0.415)	
IOR form for other activity	-0.410	0.117	-0.410	0.117
	(0.262)		(0.262)	
Number of municipalities in region	0.007	0.621	0.007	0.621
	(0.014)		(0.014)	
Total number of neighbors	0.618	0.000	0.618	0.000
	(0.109)		(0.109)	
Neighbors forming an IOR	3.794	0.000	3.794	0.000
	(0.700)		(0.700)	
Neighbors in a different IOR	-1.897	0.008	-1.897	0.008
	(0.720)		(0.720)	
Other organizations with NAD	-0.495	0.248	-0.495	0.248
	(0.429)		(0.429)	
Log likelihood	-123.950		-123.950	

Notes: N = 346. Standard errors are in parentheses.

Discussion

This paper has contributed to the call for 'a behavioral theory of the interfirm' by specifically looking at how behavioral and attention-based concepts influence the organization's propensity to form an IOR (Baum & Ingram, 2002; Gavetti et al., 2012). By synthesizing the attention-based view with the behavioral theory of the firm, we show that the attention-based view can be extended to explain *when* and *which* organizational changes will be made. In particular, we show how organizational attention shapes the search procedure and eventually directs the decision towards – or away from – IOR formation.

The behavioral theory has previously been augmented with prospect theory to explain organizational risk-taking (Bromiley, 1991). That synthesis extended the behavioral theory by predicting that risky decisions are more likely to be made when performance drops below aspiration levels. Empirical studies have provided good support for the combined theory (Nickel & Rodriguez, 2002). However, this approach has recently been criticized, as the two theories operate at different levels of analysis, hence it is important to take into account the unit of aspiration setting (Kacperczyk et al., 2015). By combining the attention-based view with the behavioral theory of the firm, we further develop explanations for which types of decisions are made in the organization, this time remaining at the organizational level.

We also provide a contribution to the IOR formation literature by focusing on an overlooked category of IOR: cost-reducing IORs. Although theoretical work emphasizes that IORs are formed for various purposes (Oliver, 1990), most IOR formation research is on IORs for R&D (e.g. Ahuja, 2000b; Eisenhardt & Schoonhoven, 1996; Lee, 2010a). Cost-reducing IORs are more rarely studied, though, Gimeno (2004), for example, looked at how the formation of IORs by rivals influences the focal firm to form an IOR in the global airline industry. Our

study contributes to a broader literature on IORs and extends even behavioral-theoretic studies of R&D alliances (Tyler & Caner, 2016).

We also make a methodological contribution by showing that applying topic modeling to the (internal) minutes of managerial meetings can be used to measure organizational attention. Compared with common ways of measuring this construct, such as interviews and (word count) content analysis of letters to shareholders, topic modeling on (internal) minutes provides superior internal and external validity. Using topic modeling, one is also able to unobtrusively capture broader categories of attention, which would be almost impossible with word count analyses.

Limitations and suggestions for future research

We acknowledge some limitations of this study. First, the empirical setting of this study was unique. Although it allowed us to collect comprehensive data and specifically track different forms of attention, we should be mindful of the idiosyncrasies of the setting and how they affected our theorization and findings. Specifically, we did not find a significant effect whereby organizations that are focused on similar organizations and are confronted with negative attainment discrepancy are more likely to form a shared facility through an IOR. This still warrants scrutiny. It is of interest to understand how such an attentional focus would play a role in a more traditional business setting, given that competitive pressures may exacerbate the tendency of firms to form a shared facility through an IOR.

Second, as explained and shown throughout the different chapters of this dissertation, the behavioral theory of the firm fits very well with the research context. In particular, the tenet that organizations make decisions when performance is unsatisfactory resonates closely with the actual behavior of these decision-makers. Because the behavioral theory of the firm was formed

on the basis of traditional business firms (as its name implies), we would certainly expect the same to occur in firms. However, it still needs to be corroborated whether firms also act in the direction of their current attention given negative attainment discrepancy. Decision-makers in firms may be motivated to acquire more foresight about upcoming problems. If this is true, when studying a certain organizational change at time *t*, attention at *t-1* and negative attainment discrepancy at *t* may be better suited to explaining organizational change. Given that decision-makers in our context have somewhat limited incentives to foresee problems in the long-term or even past the near future, we did not use lags in the independent variables (nor could we have done so, given the limited number of observations). Hence, future research should also look at the temporal difference of how the different constructs interrelate in more traditional business settings.

Third, in our setting, top management makes the decision to form IORs. This may be different in other settings (Gavetti et al., 2012). Nevertheless, we expect similar processes to occur; indeed, other work has found that IORs are sensitive to negative attainment discrepancy (Baum, Rowley, Shipilov, & Chuang, 2005; Lungeanu, Stern, & Zajac, 2015; Schwab & Miner, 2008; Shipilov, Li, & Greve, 2011; Tyler & Caner, 2016). In other settings, the scope of top management's responsibilities may differ, but IOR formation should still be susceptible to organizational-level performance measures and organizational attention (Gavetti et al., 2012).

Last, though studying cost-reducing IOR is a refreshing context for IOR research, future research could verify results with different categories of IORs. Recent work in this vein seems promising (Lungeanu et al., 2015; Tyler & Caner, 2016).

Conclusion

Organizational change does not necessarily require a change in attention: the impetus for change can also come from negative attainment discrepancy. We show that attention and negative attainment discrepancy together are powerful predictors of organizational change. Specifically, we develop the attention-based view by extending its theoretical reach not only to explain *which* types of decisions are made but also *when* decisions are made. We hope this inspires others to develop the attention-based view further by studying different types of decisions, different foci of organizational attention, and how they relate. We also add a dimension to the behavioral theory of the firm pertaining not only to the type (close vs. distant) and timing of search but also to its contents. Again, this is worthy of further research.

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Chapter 5

"In this world, it's copy or be pasted": The role of suppliers in innovation adoption

Abstract

This paper extends the innovation adoption literature by studying the role of different actors in the innovation adoption process. We theorize that firms are more likely to adopt an innovation when their competitors have adopted that innovation, but this is more than a simple matter of serving the same role in an industry. In particular, we distinguish between (1) competitors with which the focal firm has a direct business relationship (direct competitors) and (2) competitors with which the focal firm has an indirect relationship through a mutual supplier (joint-supplier competitors). We theorize that firms will adopt an innovation when they are exposed to direct and joint-supplier competitors that have adopted the innovation. Furthermore, we explore the characteristics of suppliers that play a role in this process. We also theorize that continued adoption by the same firm strongly influences the focal firm to adopt. Studying these predictions in the global console video game industry for 2006-2013, we find that firms' likelihood of adopting an innovation depend on whether their joint-supplier competitors have done so. Larger suppliers and joint-supplier competitors that continue to adopt the innovation are especially influential in this process. We discuss the underemphasized role of suppliers in the innovation adoption process and its implications for the innovation adoption literature.

Introduction

Organizations adopt innovations at different rates. The key rationale behind the adoption process is that decision makers integrate their own private information with information on how many other organizations adopt the innovation (Greve & Seidel, 2015). As the number of adopters increases, this public information becomes more convincing, as it is assumed that others choose actions that benefit them, and decision makers eventually adopt because of isomorphic pressures (Tolbert & Zucker, 1983). Thus, other organizations that can adopt the innovation are paramount in explaining the adoption process.

Other work has extended this literature by focusing on the role of different types of organizations in the adoption process. For instance, commercial communication efforts and medical journals played an important role in the adoption of the broad-spectrum antibiotic tetracycline (Van den Bulte & Lilien, 2001). Generally, mass media can stimulate the adoption process by sharing success stories of early adopters (Abrahamson & Fairchild, 1999), but in later stages, media can also exacerbate normative pressures (Compagni, Mele, & Ravasi, 2015). However, in this case, these organizations are not part of the industry in which the innovation occurs.

We know relatively little about the role of actors (e.g., suppliers) that are in the same industry in which the innovation is diffused but are unable to adopt the innovation themselves.[36] Modeling the effects of such intermediaries is important, as their role may be incorrectly attributed to the effect of other adopters. In fact, competitors and suppliers may have different interests and thus tendencies to share information on the innovation. Competitors, for instance,

[36] Greve (2009) provides a notable exception, however, considering a case in which the supplier has developed the innovation. In that case, suppliers clearly play a role in the diffusion of an innovation. In our paper, we consider an innovation developed outside the focal part of the industry, which makes the role of the supplier less evident.

have an interest in signaling and conveying maladaptive information to the focal firm (Greve & Seidel, 2015). As such, the focal firm may be better off learning from other types of firms in the industry, such as suppliers, that do business with the focal firm's competitors but have no incentive to convey malicious information to the focal firm. Indeed, Wagner, Hoisl and Thoma (2014) showed that firms that share a law firm are more likely to cite each other's patents, hinting at knowledge spillovers from indirect partners. This paper aims to separate the different roles of competitors and suppliers in the focal firm's likelihood of adopting an innovation. Specifically, we investigate the following research question: *"What roles do competitors and suppliers play in the focal firm's tendency to adopt an innovation?"*

We address this question by observing the decision to adopt digital distribution by console videogame publishers in the global console videogame industry in 2006-2013.[37] We find that competitors of the focal firm to which the firm is indirectly connected via a joint supplier (i.e., joint-supplier competitors) are more likely to adopt this innovation when those competitors have done so. Moreover, when the supplier is large and connected to adopters, the focal firm is more likely to adopt because the supplier has greater influence in persuading the focal firm to adopt. Finally, as the number of joint-supplier competitors that continue to adopt the innovation increases, the focal firm is more likely to adopt the innovation as well.

These findings of our paper extend the innovation adoption literature in multiple ways.[38] First, we differentiate between the types of firms that may influence the focal firm to adopt an innovation. Specifically, we uncover the role of firms that cannot adopt the innovation in question, e.g., suppliers, but that share information on the innovation between firms. These

[37] Although this is a process innovation, Greve (2009) showed that adoption decisions regarding process innovations are similar in essential ways to product innovation adoption decisions.

[38] The literature has labeled this the diffusion of innovation literature, yet we use the innovation adoption terminology because it more accurately describes the studied firm-level phenomenon: Innovation adoption is a firm-level phenomenon, whereas diffusion is a sector-level phenomenon.

intermediaries serve as cross-pollinators of the innovation. It is paramount to include these actors in a study of the adoption process, although they may not be adopters themselves.

Second, we start to uncover which suppliers have greater influence in the focal firm's decision to adopt the innovation. Earlier innovation adoption research has found that the adoption of certain types of firms, such as large and prestigious firms, make the focal firm more likely to adopt the innovation (Burns & Wholey, 1993; Haunschild & Miner, 1997). Although we find similar results, we argue that those social approval assets make the supplier more persuasive in its sharing of information on the innovation.

Third, by building on the work of outcome-based imitation, we show that continued adoption of the same innovation by the same firm strongly influences the focal firm to also adopt. Hence, not only the decision to adopt but also the extent of adoption is important to explain adoption processes. More research on the type and extent of adoption is thus warranted.

In summary, this paper builds novel theory for the innovation adoption literature by showing the importance of suppliers in sharing information on the innovation across a population of firms.

Context: Global console video game industry, 2006-2013

Before developing the hypotheses, we elaborate on our empirical setting to clarify the mechanisms we develop in the hypothesis development section. Our empirical setting is the console video game industry in 2006-2013. The traditional distribution channel for video game publishers has been the sales of video games through independent retail stores. With the introduction of seventh-generation video game consoles (PlayStation 3, Xbox360 and Wii), different distribution channels are available for video game publishers to sell their products to

consumers.[39] In this study, digital distribution is the innovation, where consumers can directly *download* their video games on their consoles.

To effectively create and sell an Xbox360 or PlayStation 3 game, two different parties are needed: a game publisher and a game developer. The game developer actually designs and develops the game, whereas the publisher is responsible for the game's manufacturing, marketing and distribution decisions. Thus, each launch of a new game for a given console represents a network link between a game publisher and game developer. A network was constructed for each year in the period 2006-2013 for the worldwide video game industry for the Xbox360 and PlayStation 3. Hence, we constructed a bipartite network where the nodes constitute the game developers and game publishers and the ties are the games that these two firms jointly produce. The publisher is responsible for bundling the product of the developer with its own service; thus, we treat the developer as a supplier for the publisher (Adner & Kapoor, 2010).

In this setting, video game publishers and developers share information on the distribution model in the co-development of their game. This can be information not only on the amount of games sales per distribution model but also on how the publisher addresses digital rights management and its relations with the retailer.[40] Sales information is available to the developer, which is paid on a royalty basis. Moreover, the production and distribution of a game are very intensive, with a great deal of labor needed to create a game (most developers create one game per year). With such intense collaborative effort, the developer and publisher are highly likely to care about game distribution and development. Given these long lead times, other features of the innovation are also likely to be shared between the buyer and supplier. To boost

[39] Publishers cannot offer mainstream games on the online platform for the Wii; hence, we include only games published for the Xbox360 and PlayStation 3.

[40] Although contracts are idiosyncratic, by considering a small sample of contracts that we were able to access, we can conclude that the developer is not prohibited from information on the profitability of the distribution model for the developer.

product sales, a developer that works with a publisher that distributes its games digitally is likely to share this information with other publishers it works with.

This is an appropriate setting for our research question for six reasons. First, video game publishers can publish each separate game digitally, physically, or both. Hence, we can observe the proportion of games that are published digitally, and if that number increases, then we would observe adoption of the innovation. As such, the lack of third distribution option facilitates a clean analysis of the process of adopting digital distribution.

Second, the suppliers in this setting, which are the video game developers that produce the game, are paid a royalty fee for each game sold. Thus, the suppliers have an interest in maximizing the sales of the buyer, which is the publisher in this setting. Hence, we can more clearly observe how suppliers influence the innovation adoption process.

Third, the firm's decision to organize a transaction via a retail store versus a download transaction has far-reaching consequences for the firm. Download transactions do not necessitate the production, storage, and transportation of actual disks. Publishers do not necessarily need to invest in these disks but are now able to send the product to the customer and revise it subsequently. Publishers can also decide to use both distribution methods simultaneously for the same game. Thus, the adoption decision may seem straightforward; however, digital distribution also has a downside: it introduces tensions into the publisher-retailer relationship (Kumar & Ruan, 2006). The financial terms of physical and digital distribution are blurry, making it difficult for the publisher to make the adoption decision. This problem is important for publishers, which must understand the profitability of the innovation before engaging with it.

Fourth, tie formation is instigated by the supplier in this setting, as the idea of a new game originates at the supplier. Hence, any endogeneity pertaining to self-selection is not present

in our study; i.e., the ties are not formed to gain more information regarding innovations.

Fifth, we had access to the complete population of firms in the console video game industry. This access is crucial, as adoption events are interdependent; missing data on a portion of the population would raise estimation issues (Greve, Strang, & Tuma, 1995).

Sixth, although competition is extreme, console video game publishers compete mainly on the (perceived) quality of their products. Digital distribution can support the competitive position by allowing the publisher to sell more games or to potentially increase their margin by eliminating the retailer; however, without (perceived) good games, the innovation itself is not expected to improve the competitive position of the publisher. Thus, we can rule out competition reasons for the adoption decision.

Conceptual development

The key assumption in the innovation adoption literature is that decision makers make the decision to adopt based on their own private information and public cues regarding whether others also adopt (Greve & Seidel, 2015). A considerable body of literature has found that as the focal firm is increasingly exposed to information on an innovation, it has an increasing likelihood of adopting the innovation (Burns & Wholey, 1993; Davis, 1991; Greve, 1996; Haunschild, 1993; Palmer et al., 1993; Westphal et al., 1997). The main argument is that as the number of adopting firms connected to the focal firm increases, the firm receives an increasing quantity of social information or influence, which subsequently increases its changes in adopting that same practice (Abrahamson & Rosenkopf, 1997; Haunschild, 1993; Kraatz, 1998). This frequency-based mechanism can explain innovation adoption (Haunschild & Miner, 1997).

Three theories explain why the focal firm becomes more likely to adopt an innovation as

the number of other firms that adopts the innovation increases.[41] First, increasing returns theory assumes that the profitability of the innovation is known, since the costs of an innovation can be inferred from its price and since returns are easily observable or obtainable from an external source (Abrahamson & Rosenkopf, 1993). Firms are more likely to adopt the innovation as more firms adopt it, since network externalities improve returns and/or adoption costs decrease (Katz & Shapiro, 1992).

Second, learning theory assumes that an innovation's profitability is ambiguous and that organizations must learn about the innovation to make a decision to adopt or not (Abrahamson & Rosenkopf, 1997). Observing that other firms are adopting an innovation conveys information to the focal firm that adopting the innovation has advantages; otherwise, the firms would have not adopted it (Rao, Greve, & Davis, 2001).

Third, the fad theory of bandwagons argues that gaining information on merely the number and identity of adopters drives other firms to adopt as well (Abrahamson & Rosenkopf, 1997). Thus, this theory focuses on information regarding which firms have adopted the innovation instead of information on the innovation itself. The more firms adopt the innovation, the more it becomes the norm or even becomes legitimate to adopt the innovation (Meyer & Rowan, 1977). Thus, adopters exert isomorphic pressures, meaning that a firm that observes another firm performing a certain action is inclined to imitate it since the observed action is perceived to be rational (DiMaggio & Powell, 1983). As complying with these isomorphic pressures generates legitimacy for the focal firm (Deephouse, 1996; DiMaggio & Powell, 1983) and legitimacy in turn offers the firm improved access to the resources of other parties in the

[41] In our setting, other theories, such as resource dependency and transaction cost economics, can explain why firms decide to adopt the new distribution model. These theories do not focus on information transfer. Since one of the key assumptions in the innovation adoption literature is that organizations adopt based on public cues of whether others adopt (through information exchange), we decided not to use these theoretical lenses to study our phenomenon. However, we will return to these alternative explanations when we discuss our control variables.

industry (DiMaggio & Powell, 1983), firms are highly likely to conform to these pressures.

The innovation adoption literature has further sought to uncover which types of firms are more likely to be relevant in influencing the focal firm to adopt an innovation. This is also known as the trait-based mechanism by which innovations diffuse (Haunschild & Miner, 1997). For instance, firms with which the focal firm has an alliance are more willing to share information and can be considered more trustworthy (Kraatz, 1998; Shipilov, Greve, & Rowley, 2010). Moreover, firms that are more geographically proximate may be more influential because they are easier to observe and more relevant as competitors for the focal firm (Greve, 2009; Greve & Seidel, 2015; Lee & Pennings, 2002).

The third mechanism by which organizations imitate others and, thus, innovations are diffused is outcome-based imitation (Haunschild & Miner, 1997). For outcome-based imitation, the consequences of adoption by others are the drivers for adoption by the focal firm (Haunschild & Miner, 1997). For instance, when the performance of other firms that adopt an innovation increases after that adoption, the focal firm also has an incentive to adopt.

One important contribution to the innovation adoption literature was its synthesis with social network research. Specifically, Abrahamson and Rosenkopf (1997) and Kraatz (1998) showed that a firm's direct contacts (e.g., through a business relationship) are particularly influential since decision makers tend to base their decisions on social cues when facing ambiguous situations. Thus, as a baseline, we propose that the focal firm's likelihood of adopting the innovation increases with the number of direct contacts that have adopted the innovation.

Hypothesis development

Frequency-based mechanism

Although the literature has found strong support for the effect of the number of adopting firms on the focal firm's likelihood of adopting the innovation, the general assumption has been that information flows from the adopting firm directly to the focal firm. Individuals from one firm discuss the innovation with another firm, and as such, the innovation is diffused throughout the population (Greve, 2011). As such, the indirect contacts of the firm matter insofar a firm's partners carry the information and experience from their interactions with other partners to the focal firm (Ahuja, 2000a; Bastos & Greve, 2003; Gulati & Gargiulo, 1999). However, other types of firms, including those that cannot adopt the innovation, can also share information on the innovation.

One particular ubiquitous type of firm is the supplier. A supplier may not be in a position to adopt all the practices that a buying firm may employ, specifically related to operational practices of the buying firm. As suppliers and buyers interact, they mutually adjust their design and operations functions, through which technical exchanges occur (Kotabe, Martin, & Domoto, 2003; Takeishi, 2001). Both the buyer and supplier stand to benefit from these exchanges; hence, both have an incentive to share information. As a result of these exchanges, the supplier can become aware of any innovation the buying firm has adopted and, more importantly, can estimate its profitability and the way the innovation is implemented (Dyer & Nobeoka, 2000). For example, in their study on the motorcycle industry, Lipparini, Lorenzoni, and Ferriani (2014) found that buyers exchanged information and techniques on product concepts and assembly designs to suppliers. Similarly, Uzzi (1996) found that buyers and suppliers share information on which product is high in market demand. Moreover, buyers provided "checkup visits to their

company and plant, […] training about production methods and working practices (such as just-in-time and lean production principles) to align and synchronize manufacturing and assembly processes" (Lipparini et al., 2014: 584). Furthermore, the sharing of some information with the supplier may be a technical requirement as part of the transaction. Thus, information on any adopted innovation can be shared in a buyer-supplier relationship.

Suppliers rarely do business with only one buyer, since this situation invokes dependency (Pfeffer & Salancik, 1978). As suppliers do business with multiple buyers, they can share the information on innovations garnered from one buyer with another buyer. Although the literature has focused mainly on information flows from the buyer to the supplier, Lipparini et al. (2014) provide a notable exception. Suppliers have an incentive to share information with their buyers, as sharing information can make it more difficult for the buyer to switch to other suppliers (Lipparini et al., 2014). Alternatively, suppliers that share information are likely to see their actions reciprocated (Coleman, 1988; Dyer & Nobeoka, 2000). An example of information sharing is that suppliers alert "partners about advances in state-of-the-art technologies and [propose] design alternatives to allow them to fulfill their customers' unique demands more completely" (Lipparini et al., 2014: 591). Information regarding these technologies may thus come from the buyer's competitors. Hence, suppliers are likely to share information on innovations adopted by other buyers.

Thus, since buyers share information on their adopted innovations with suppliers, which can subsequently share this information with other buyers, we propose the following:

Hypothesis 1: The more the focal firm is exposed to an innovation by its joint-supplier competitors through their mutual suppliers, the more likely the firm is to adopt the

innovation.

Trait-based mechanism

Previous literature has argued that adopters can vary in their infectiousness as experienced by non-adopters. Grounded in institutional theory, this literature assumes that when facing uncertainty, managers look to admired firms for action (DiMaggio & Powell, 1983). Organizations with greater organizational celebrity, age, size, and prestige have been found to be more influential in the adoption process (Angst, Agarwal, Sambamurthy, & Kelley, 2010; Burns & Wholey, 1993; Haunschild & Miner, 1997; Haveman, 1993; Terlaak & King, 2007). The key mechanism is that such organizations are more infectious because others will adopt in order to achieve the same level of prestige or success or at least to gain their social approval (Burns & Wholey, 1993; Haunschild & Miner, 1997).

Given that we have established that potential adopters receive information regarding the innovation via their suppliers, we pay specific attention to how the aforementioned characteristics may also matter for the suppliers. In this case, we do not use the term infectiousness, since the suppliers have not adopted the innovation themselves, but use the term persuasiveness. Persuasiveness can be considered the strength with which a social actor can create social impact (Nowak, Szamrej, & Latané, 1990). Although the same characteristics may be important, different processes exist for persuasiveness than for infectiousness.

One established factor that plays a role is organizational size (Haunschild, 1993; Haunschild & Miner, 1997). On the one hand, larger suppliers have greater access to more resources to pay attention to and store the information of adopting buyers, which they can subsequently share with their other buyers. On the other hand, larger suppliers are also more

likely *listened to*, as their size bestows them with greater power in the buyer-supplier relationship (Pfeffer & Salancik, 1978). Organizational size also makes organizational members more influential because more members are likely to be involved in the buyer-supplier interactions (Bellizzi, 1981; Kohli, 1989). As the number of members increases, they exert more social influence on the other party (Nowak et al., 1990; Wolf & Latané, 1983).

Greater size is also often regarded as a form of success (Haveman, 1993). At the individual level, prior success fuels the individual's credibility, which can make the individual more persuasive (Sternthal, Phillips, & Dholakia, 1978).[42] Similarly, at the organization level, more successful organizations can be more persuasive insofar their information is credible. Combining these arguments, we propose the following:

Hypothesis 2: The larger the focal firm's suppliers that are connected to buyers that have adopted an innovation, the more likely the focal firm is to adopt the innovation.

Outcome-based mechanism

Organizations are likely to adopt the practices of other organizations that they consider beneficial (Haunschild & Miner, 1997). This effect has been found in investment banker choices, where bankers were chosen because they were involved in deals with low acquisition premiums (Haunschild & Miner, 1997). In other studies, strikes in the French coal mine industry are more likely to occur after successful prior strikes (Conell & Cohn, 1995), Japanese firms imitate successful prior entry modes (Lu, 2002), and American liberal arts colleges adopt the same successful practices as their network contacts (Kraatz, 1998).

[42] In some cases, source credibility may be a liability instead. For a discussion of the conditions under which credibility is favorable or less favorable, see Sternthal et al. (1978).

Thus, the level of exposure (frequency) and the type of firms that have adopted (trait) are not the only relevant factors; the outcomes of adopting the innovation are also important.

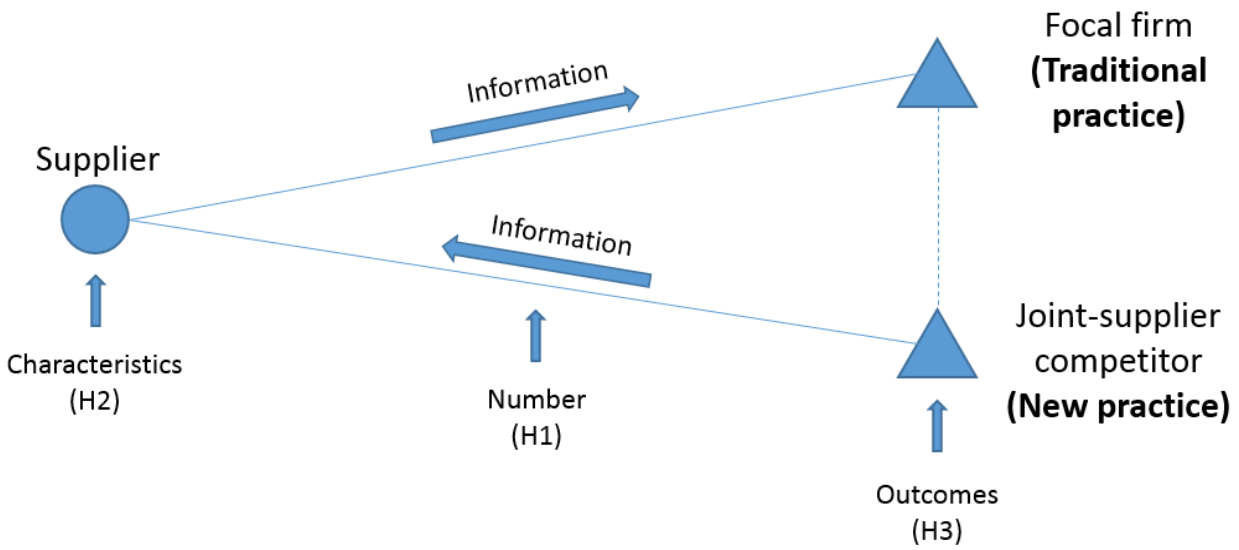
An organization may find it difficult to assess the benefits of adoption of a particular innovation. However, a clear signal for benefits arises when an organization continues to adopt an innovation after initial adoption. When an organization adopts an innovation, it accumulates information that allows it to more accurately judge its value (Greve, 2009). Thus, continuing adoption by the same firm provides insight to other firms that the innovation is beneficial. In turn, other firms are also more likely to adopt the innovation as well.

Similarly, suppliers can receive information on an innovation from their buyers. However, the supplier may find it difficult to accurately judge the benefits of an innovation since the operations between up- and downstream firms differ more than those of firms in the same position in the supply chain. However, continued adoption of an innovation is an unequivocal sign that the innovation is beneficial. Consequently, the supplier is likely to share the innovation information with its other buyers. The more that such joint-suppliers continue to adopt the innovation, the stronger the signal is to the focal firm, which is thus more likely to adopt the innovation as well.

Hypothesis 3: The higher the number of joint-supplier competitors that continue to adopt the innovation, the more likely the focal firm is to adopt the innovation.

Figure 1 depicts the three hypotheses.

Figure 1
Depiction of hypotheses



Method

In this study, we used the full population of 100 video game publishers in the global console video game industry in 2006-2013 for the PlayStation 3 and Xbox360.[43] In total, the sample comprises 312 firm-year observations. The panel is not balanced, since some publishers do not publish games every year and some publishers entered the industry in the sample period. These firms are essentially all the active video game publishers for the Xbox 360 and PlayStation 3 worldwide. We drew our data from www.gamefaqs.com, a respected website in the video game industry with ties to the renowned website www.gamespot.com, which is the 65th most-visited site in the United States and the most popular site for video games (Zhu & Zhang, 2010). Similar studies on the video game industry have drawn from this same database (e.g. Venkatraman &

[43] The Xbox360 was introduced in 2005, but we exclude the observations from 2005, since we have only a small number of observations in this period and measures (especially the network-related measures) can be thought of as outliers. The year 2005 includes only approximately one month's worth of partial observations, since the Xbox360 was introduced on 22 November and the PlayStation 3 had not yet been introduced.

Lee, 2004). Information regarding ownership structures was gathered from www.mobygames.com, which has also been used in other research (De Vaan, Vedres, & Stark, 2015).

Dependent variable

Innovation adoption (InnovAdopt$_{i,t}$). The dependent variable in this study is the occurrence of innovation adoption. The innovation is adopted when video game publisher *i* changes its distribution model toward digital distribution at time *t*. This variable is measured by dividing the number of distinctive games offered digitally by the total number of distinctive games offered[44] (this number includes games offered physically and digitally) per video game publisher per year. If this ratio changes positively from *t-1* to *t*, we code this as 1, meaning that the firm has changed its distribution model to digital distribution in that year. Because hypothesis 3 concerns the effect of continued adoption by joint-supplier competitors, firms that change their distribution model are retained in the data. This approach is consistent with that used in other innovation adoption studies (Greve, 1998a, 2009).[45] Since we study innovation adoption, a publisher that did not publish any games at *t-1* is excluded for that year (since this publisher is treated as an entrant).

Independent variables

Number of indirect ties to joint-supplier competitors with a more digital distribution model. To test the first hypothesis, we considered the focal firm's tie portfolio at *t-1*. We then considered the tie portfolios of the developers in the focal firm's tie portfolio. We counted the number of ties the developer had with its alters that had a more digital distribution model than the focal firm (the cut-off value is 10 percentage points) at *t-1*. We expect the coefficient to be positive.

Size of suppliers that are connected to buyers with a more digital distribution model. We

[44] These two numbers reflect the number of games published (thus, each title increases this number by one) and should not be confused with the number of games sold.

[45] As a robustness check, we also examine the results when the dependent variable concerns first-adoption events.

considered the focal firm's tie portfolio at *t-1*, and we then considered the tie portfolios of the developers in the focal firm's tie portfolio. We excluded the developers that did not have ties with publishers with a more digital distribution model than the focal firm (the cut-off value is 10 percentage points) at *t-1*. For the remaining developers, we calculated the average size, which was measured by counting the total number of games developed per video game developer per year.

Number of joint-supplier competitors that do not have a full physical distribution model that changed their distribution model to become more digital. To test the first hypothesis, we considered the focal firm's tie portfolio at *t-1* and the tie portfolios of the developers in the focal firm's tie portfolio. We counted the number of alters of the developer that did not have a full physical distribution model at *t-1* and that changed their distribution model to become more digital at *t-1*.

Control variables

Our first set of control variables vary on three dimensions: (1) the type of firm (direct competitor, joint-supplier competitor, or conduit supplier), (2) the construct (number of ties (frequency), size of the supplier (trait), and number of joint-suppliers changing distribution models again (outcome)), and (3) firms that have a more digital or more physical distribution model than the focal firm. Table 1 shows how these dimensions jointly form the control variables for our study.

Table 1
Overview of measures

		Number	Size	Age	Subsequent changes
Direct competitor	Digital	CV (baseline)	CV	CV	CV
	Physical	CV	CV	CV	CV
Joint-supplier competitor	Digital	IV (H1)	CV	CV	IV (H3)
	Physical	CV	CV	CV	CV
Conduit supplier	Digital	N/A	IV (H2)	Alternative IV (H2)	N/A
	Physical	N/A	CV	CV	N/A

IV and CV denote the independent variable and control variable, respectively

Direct competitors were measured by considering the focal firm's tie portfolio at *t-1* and selecting the firms that are publishers in this portfolio. Joint-supplier competitors were measured by considering the focal firm's tie portfolio at *t-1*. We then considered the tie portfolios of the developers in the focal firm's tie portfolio. Thereafter, we selected the developer's ties with the publisher (excluding the focal firm). Conduit suppliers were measured by observing the focal firm's tie portfolio at *t-1* and selecting the suppliers in that portfolio that had connections with publishers with a different distribution model than the focal firm.

The number of ties was measured as the count of video games jointly commercialized at year *t*. Size was measured by counting the total number of games developed/published per firm *i* per year *t*. The number of joint-supplier competitors changing their distribution model again was measured by counting the number of publishers that did not have a full physical distribution model and that changed their distribution model in year *t*.

Finally, a more digital or more physical distribution model was measured by observing the distribution model of the focal firm and juxtaposing it with its competitor (direct or joint supplier) using a cut-off value of 10 percentage points. The full list of this set of control variables is visible in Table 1.

We also controlled for the following focal firm characteristics that can influence the

firm's susceptibility and propensity to adopt an innovation. [46]

Retail sales. Firms may be more likely to adopt the new distribution model if they rely less on their current distribution model. Therefore, we included a measure of retail sales per publisher. We calculated the sum of retail sales per publisher *i* per year *t*. Additionally, this control can be used to rule out resource dependency reasons for vertical integration (Pfeffer & Salancik, 1978), given that increased retail sales implies dependency.

Reputation. We measured reputation by calculating the average critic score for the games developed by firm *i* at time *t*. To measure quality, we used the data from www.metacritic.com. Metacritic's score rating represents the opinions of the most respected critics writing online and in print in the form of a single number labeled a "metascore" by Metacritic.

Degree centrality. We also controlled for the degree centrality of firm *i* at time *t*, which is defined as the number of ties that firm *i* has at time *t*.

Betweenness centrality. The fourth control variable, the degree of diversity of information access, was measured by calculating the betweenness centrality for video game publisher *i* at time *t*. Betweenness centrality measures the centrality of the focal actor in a network and captures the extent to which a firm is located on the shortest path (i.e., geodesic) between any two actors in its network. Formally, firm *i*'s betweenness centrality in year *t* is calculated as:

$$Betweenness\ Centrality_{i,t} = \sum_{j<k} g_{jk}(n_i)/g_{jk}$$

where $g_{jk}(n_i)$ refers to the number (n) of geodesics (i.e., shortest paths) linking firms *j* and *k* that contain focal firm *i*. The term $g_{jk}(n_i)/g_{jk}$ captures the probability that firm *i* is involved in the shortest path between *j* and *k*. Betweenness centrality is the sum of these estimated

[46] We also considered game characteristics, particularly genre, as this could lead some developers to work with a set of publishers that are more likely to facilitate digital distribution. We juxtaposed the number of titles distributed physically with those distributed digitally for each video game genre and found no significant differences.

probabilities over all pairs of firms (excluding the *i*-th firm) in the network. Betweenness centrality is normalized (i.e., divided by the maximum possible betweenness score at time *t*).

Size. Smaller firms find it easier to adopt a new distribution model than larger firms do (Hannan & Freeman, 1977, 1984), especially with respect to how we measured the dependent variable here. To control for this effect, we counted the total number of games published per video game publisher per year. Additionally, this control allows us to rule out transaction cost reasons for vertical integration of the publisher into distribution, to the extent that increased frequency would push publishers to vertically integrate (Williamson, 1981). The total number of games published per video game publisher can be regarded as a proxy for the frequency with which transactions occur.

Percentage of games distributed digitally. We controlled for the percentage of games distributed digitally at *t-1*, as the likelihood of adopting the innovation is different when the firm has a full physical model than when the firm has already started adopting the innovation to some extent.

After penetration. We include an after-penetration dummy to account for factors that affect all sample firms in the same way. Because the new distribution model penetrated the industry in 2010, this dummy variable takes the value 0 for all years after 2009. Industry-level effects such as improvements in broadband technology might make digital distribution more attractive and hence induce adoption of a distribution model. Additionally, the observation of a prestigious or large publisher adopting a digital distribution model might spur other firms in the sample to adopt a digital distribution model (Haveman, 1993). This possibility is also accounted for by the after-penetration dummy; as such, an observation would have the same influence on all firms in terms of whether to change their distribution model.

Number of other firms that have adopted. Finally, we measured the number of firms other than

firm *i* that have adopted the innovation at *t-1*.

Figure 2 shows the industry network in 2009, which is the most interesting network before the complexity in interpreting the network becomes too great. The triangle-shaped and circle-shaped nodes are game publishers and game developers, respectively. The node color indicates the cumulative number of distribution model changes up to and including 2009. The darker the node, the more changes have been made in the period 2006-2009. The darkest nodes have changed their distribution model each year.

Analysis

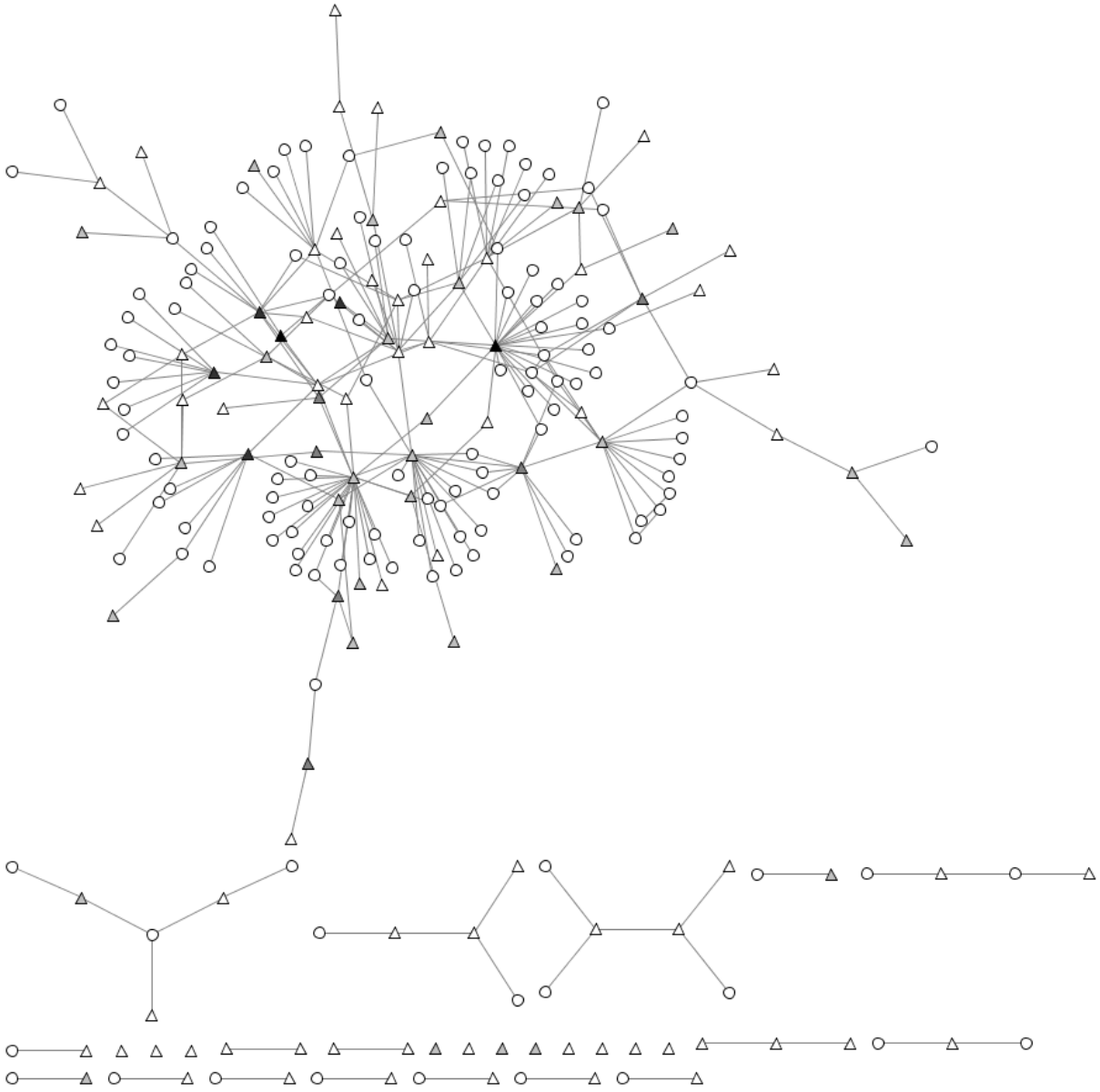
We employed an event historical approach with repeated events to study the innovation adoption decision.[47] In this case, the event is the choice of a firm to adopt a more digital distribution model. In traditional event history analyses, the observation (here, the organization) is removed from the dataset when the event occurs. However, an organization can adopt the digital distribution model further in other periods; i.e., it is not confined to adopt it only once.

We used a discrete time model: a logistic regression with fixed effects. In discrete time analysis, logit models of dichotomous outcomes within pooled time series data are estimated, with multiple organizations observed at multiple intervals. These models allow us to estimate the hazard of the occurrence of an event such as distribution model adoption in any of *t* discrete time periods. Covariates are allowed, but not required, to vary between time periods.

[47] We chose not to use the heterogeneous diffusion model (Greve et al., 1995), as this model cannot incorporate actors that cannot adopt the innovation, i.e., the suppliers. In particular, the characteristics of such actors cannot be included in the model.

We also included fixed effects to control for unobserved heterogeneity among organizations. Organization-level fixed effects help control for previously found effects, such as cumulative technological experience (Pennings & Harianto, 1992a, b), routines for responding to environmental stimuli (Amburgey & Miner, 1992; Kelly & Amburgey, 1991), and organizational age (Hannan & Freeman, 1984; Miller & Chen, 1994). Past research has shown that endogeneity in a firm's network position is an important issue in network research and that analyses of the consequences of network positions should include fixed effects (Lee, 2010b). Left censoring is not present in our data, since we consider all games published for the Xbox360 and PlayStation 3 since their introduction (with the exception of games published in 2005, but this number is very small). Right censoring, caused by truncating the observation period at 2013, is routinely and robustly handled within event history analysis (Tuma & Hannan, 1984).

Figure 2
The console video game industry network in 2009



Results

As an introduction to the results, Table 2 shows the mean, standard deviation, minimum and maximum for each variable. Table 3 provides some additional descriptive statistics on the ties in the networks. We removed 53.06% of the games from the network, as they were developed by

publishers in-house.[48] Of the ties, 97.50% of the ties are unique games; only in 2.50% of cases were two developers involved in the game, and therefore, a tie was drawn between the developers and between each developer and publisher. Finally, when we excluded games developed in-house, 32.16% of the games were developed by a publisher that contracted out publishing activities to another publisher (mostly to typical North-American or Japanese publishers).

Table 4 provides the matrix of correlations among all variables. Several observations can be made. First, multicollinearity is likely to be an issue. Multicollinearity increases the standard deviations of the variables but does not violate the model's assumptions. As such, we decided to include the variables in the model and evaluate its conservative results. We ran models by entering one variable at a time and inspected the estimated parameters (e.g., sign change) to judge whether multicollinearity was affecting our results. We did not run a model with all variables, as this would exacerbate the multicollinearity issue.

[48] Note that these games are not excluded for the construction of the dependent variable. Excluding these loops from the network impacts only the degree centrality variable. We ran additional tests without the degree centrality variable, and the results remain the same.

Table 2
Descriptive statistics

Table 2. Descriptive statistics

Variable	Observations	Mean	S.D.	Min	Max
Innovation adoption	490	0.38	0.49	0	1
No. of indirect ties to adopting **joint-supplier** competitors	346	0.68	1.77	0	15
Size of **suppliers** with ties to adopting joint-supplier competitors	346	1.2	2.51	0	13
Number of **joint-supplier** competitors that subsequently change to digital	346	0.63	1.54	0	10
No. of ties to adopting **direct** competitors	346	0.16	0.9	0	12
Size of adopting **direct** competitors	346	0.79	3.85	0	29.3
No. of ties to non-adopting **direct** competitors	346	0.31	1.37	0	12
Size of non-adopting **direct** competitors	346	0.84	4.01	0	40.4
Size of adopting **joint-supplier** competitors	346	5.33	12.1	0	76
No. of indirect ties to non-adopting **joint-supplier** competitors	346	0.82	2.2	0	14
Size of non-adopting **joint-supplier** competitors	346	3.09	8.68	0	55
Number of **joint-supplier** competitors that have switched back to physical	346	0.49	1.31	0	9
Size of **suppliers** with ties to non-adopting joint-supplier competitors	346	0.89	2.07	0	13
Retail sales	490	3.72	8.86	0	56.4
Reputation	490	3.74	2.76	0	9.5
Degree centrality	490	4.34	3.68	0	23
Betweenness centrality	490	420.23	811.91	0	6316.48
Size	490	7.88	11.62	1	76
Percentage of titles distributed digitally	346	0.17	0.26	0	1
After penetration	490	0.61	0.49	0	1
Number of other firms that have adopted	346	35.81	23.01	0	62

Table 3
Additional descriptives

Table 3. Additional descriptives

Percentage of games developed in-house by the publisher	2126 / 4007 = 53.06%
Percentage of games developed by two game studios	100 / 4007 = 2.50%
Percentage of games where a publisher develops a game for a different publisher (excluding games produced in-house)	605 / 1881 = 32.16%

Table 4
Correlation matrix

Table 4. Correlation matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	Innovation adoption	1																				
2	No. of indirect ties to adopting **joint-supplier** competitors	0.24	1																			
3	Size of **suppliers** with ties to adopting joint-supplier competitors	0.29	0.68	1																		
4	Number of **joint-supplier** competitors that subsequently change to digital	0.21	0.53	0.39	1																	
5	No. of ties to adopting **direct** competitors	0.13	0.11	0.15	0.26	1																
6	Size of adopting **direct** competitors	0.12	0.11	0.07	0.13	0.73	1															
7	No. of ties to non-adopting **direct** competitors	0.06	0.01	0.01	0.19	0.14	0.23	1														
8	Size of non-adopting **direct** competitors	0.04	0.03	0.08	0.28	0.14	0.20	0.75	1													
9	Size of adopting **joint-supplier** competitors	0.26	0.60	0.67	0.39	0.11	0.09	0.02	0.04	1												
10	No. of indirect ties to non-adopting **joint-supplier** competitors	-0.02	0.05	0.15	0.40	0.10	0.04	0.28	0.35	0.10	1											
11	Size of non-adopting **joint-supplier** competitors	0.02	-0.01	0.04	0.34	0.00	-0.01	0.22	0.27	0.00	0.50	1										
12	Number of **joint-supplier** competitors that have switched back to physical	0.02	0.42	0.35	0.34	0.05	0.08	0.23	0.29	0.29	0.54	0.31	1									
13	Size of **suppliers** with ties to non-adopting joint-supplier competitors	0.01	0.14	0.31	0.42	0.09	0.06	0.20	0.27	0.21	0.80	0.57	0.51	1								
14	Retail sales	-0.01	-0.02	0.02	-0.00	0.01	0.10	0.29	0.24	0.02	0.21	0.08	0.13	0.18	1							
15	Reputation	0.03	-0.03	0.02	0.07	0.09	0.07	0.11	0.11	0.06	0.12	0.06	0.02	0.10	0.32	1						
16	Degree centrality	0.12	0.23	0.18	0.29	0.07	0.05	0.27	0.19	0.18	0.34	0.20	0.31	0.36	0.51	0.18	1					
17	Betweenness centrality	0.17	0.21	0.22	0.28	0.11	0.09	0.36	0.25	0.20	0.42	0.25	0.39	0.37	0.40	0.16	0.79	1				
18	Size	0.14	0.15	0.08	0.25	0.08	0.10	0.37	0.24	0.12	0.40	0.24	0.28	0.36	0.70	0.22	0.77	0.66	1			
19	Percentage of titles distributed digitally	-0.12	-0.02	0.01	0.28	0.02	-0.03	0.16	0.18	-0.01	0.39	0.46	0.21	0.43	0.00	-0.04	0.08	0.13	0.10	1		
20	After penetration	0.35	0.25	0.29	0.28	0.11	0.09	0.13	0.13	0.25	0.24	0.23	0.22	0.28	-0.14	-0.18	-0.04	0.17	-0.00	0.43	1	
21	Number of other firms that have adopted	-0.04	0.00	0.03	-0.01	0.09	0.09	0.04	-0.00	0.06	0.05	0.07	0.02	0.03	0.11	0.13	0.17	0.13	0.10	0.05	-0.07	1

Table 5 represents the results of the conditional logit regression analysis using fixed effects. Model 1 includes all control variables, whereas Models 2 to 4 each include a variable that is used to test each hypothesis.

For the hypothesis tests, we used a threshold for the p-values of 0.10 and focused on the effect magnitudes for the following three reasons. First, because we have data on the complete population of organizations, p-values are irrelevant (Schwab et al., 2011).[49] Second, the magnitudes are relatively large such that for many cases, the independent variables have a large impact. Third, *n* is relatively small (n = 278); thus, p-values are likely to be higher. We have no means of increasing *n*, as we have the full population of organizations

In model 2, we include the count of ties to joint-supplier competitors that have adopted the innovation and additionally control for the count of ties to joint-supplier competitors that have not adopted the innovation. Consistent with hypothesis 1, we find a significant and positive effect of the number of adopting joint-supplier competitors (p = 0.012). The odds ratio is 1.338.[50] Thus, for a focal firm with one additional tie to a joint-supplier competitor that has adopted the innovation, the odds that the focal firm adopts the innovation increase by 1.338.

[49] One could argue that it is still relevant to use a stricter p-value threshold, as one could see our data as a "sample" for different populations and different "periods" for the same population. However, this view assumes that conditions remain the same across different populations or across different periods. Using statistical theory for this purpose is inappropriate (Schwab et al., 2011). We address such issues of external validity in the discussion section.

[50] Although we acknowledge the drawbacks of using the odds ratio to interpret the results (Hoetker, 2007; Zelner, 2009), this is the best alternative available. Since we use a conditional fixed-effects logit model, it does not make sense to calculate the effects on different values of the variables, since these methods set the fixed effects equal to 0. For the odds ratio, the values of the other variables are irrelevant.

Table 5
Conditional fixed-effects logit results

Table 5. Conditional fixed-effects logit results

Model	1		2		3		4	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
No. of indirect ties to adopting **joint-supplier** competitors (H1 +)			1.338	0.012				
			(0.156)					
Size of **suppliers** with ties to adopting joint-supplier competitors (H2 +)					1.390	0.008	1.475	0.005
					(0.174)		(0.206)	
Number of **joint-supplier** competitors that subsequently change to digital (H3 +)							1.395	0.019
							(0.198)	
No. of ties to adopting **direct** competitors	1.380	0.279	1.617	0.171				
	(0.411)		(0.568)					
Size of adopting **direct** competitors					1.119	0.060	1.128	0.042
					(0.067)		(0.067)	
No. of ties to non-adopting **direct** competitors	0.982	0.865	1.013	0.907				
	(0.107)		(0.115)					
Size of non-adopting **direct** competitors					0.989	0.783	0.976	0.583
					(0.038)		(0.044)	
Size of adopting **joint-supplier** competitors					1.027	0.219	1.018	0.445
					(0.023)		(0.024)	
No. of indirect ties to non-adopting **joint-supplier** competitors			0.836	0.039				
			(0.072)					
Size of non-adopting **joint-supplier** competitors					1.090	0.001	1.083	0.003
					(0.029)		(0.029)	
Number of **joint-supplier** competitors that have switched back to physical							0.834	0.224
							(0.124)	
Size of **suppliers** with ties to non-adopting joint-supplier competitors					0.646	0.001	0.676	0.007
					(0.089)		(0.098)	
Retail sales	0.951	0.087	0.943	0.069	0.947	0.124	0.960	0.246
	(0.028)		(0.030)		(0.034)		(0.034)	
Reputation	1.203	0.103	1.264	0.045	1.376	0.015	1.384	0.024
	(0.136)		(0.147)		(0.180)		(0.199)	
Degree centrality	1.171	0.113	1.199	0.097	1.373	0.007	1.345	0.014
	(0.116)		(0.131)		(0.161)		(0.163)	
Betweenness centrality	1.000	0.375	1.000	0.588	1.000	0.186	1.000	0.248
	(0.000)		(0.000)		(0.000)		(0.000)	
Size	1.051	0.189	1.071	0.108	1.053	0.230	1.055	0.220
	(0.040)		(0.046)		(0.046)		(0.046)	
Percentage of titles distributed digitally	0.012	0.000	0.025	0.000	0.013	0.000	0.006	0.000
	(0.011)		(0.023)		(0.014)		(0.008)	
After penetration	10.723	0.000	7.900	0.000	6.557	0.001	6.355	0.002
	(5.493)		(4.345)		(3.812)		(3.820)	
Number of other firms that have adopted	0.974	0.679	0.969	0.622	0.994	0.923	0.980	0.761
	(0.062)		(0.063)		(0.066)		(0.066)	
Log likelihood	-85.732		-79.731		-69.332		-65.479	
n	278		278		278		278	

By comparison, the effect of direct competitors is stronger (odds ratio is 1.617) yet statistically less significant ($p = 0.171$). Thus, on average, an additional direct competitor that has adopted the innovation will increase the focal firm's odds of adoption by 1.617. Non-adopting direct competitors have a negligible effect on the focal firm's decision to adopt. However, non-adopting joint-supplier competitors do have a significant negative effect, with an odds ratio of 0.836 ($p = 0.039$).

Hypothesis 2 is tested in model 3, where, in addition to the control variables in model 1, we control for the average size of suppliers with ties to non-adopting joint-supplier competitors. We find a significant positive effect of the average size of suppliers with ties to adopting joint-supplier competitors that have adopted the innovation ($p = 0.008$). The odds ratio is 1.390; therefore, as the average size of suppliers with ties to adopting joint-supplier competitors increases by 1, the odds that the focal firm adopts the innovation increase by 1.390. Thus, we find support for hypothesis 2.

The size of direct competitors also matters (odds ratio is 1.119, $p = 0.060$). In comparison with the effect of supplier size, however, this effect is weaker in magnitude. The size of non-adopting direct competitors and the size of joint-supplier competitors (both adopting and non-adopting) have little influence. Nevertheless, the size of suppliers that serve as conduits for non-adopting joint-supplier competitors matters greatly (odds ratio = 0.646, $p = 0.001$).

Finally, in model 4, we test hypothesis 3. We find a significant positive effect of the number of joint-supplier competitors that continue to adopt the innovation after initial adoption ($p = 0.019$). The odds ratio is 1.395; hence, when one additional joint-supplier competitor continues to adopt the innovation, the odds that the focal firm adopts the innovation increases by 1.395. Thus, we find support for hypothesis 3.

Robustness checks

In our previous models, to test hypothesis 2, we chose to measure the average supplier size to show that the trait-based mechanism is also present when including the supplier in the adoption process. As a robustness check for this mechanism, we also chose to analyze the effect of the average age of the supplier. Age is a reflection of experience and expertise, especially in rapidly changing industries. At the individual level, those with high expertise have a greater social influence than those with low expertise (Sternthal et al., 1978; Wolf & Latané, 1983). At the organization level, organizations with more experience are likely to be more persuasive such that buyers are more likely to adopt the insights received from older suppliers.

In model 5 of Table 6, we test this effect of average supplier age. Consistent with the effects of supplier size, we find a significant and positive effect of the average age of suppliers with ties to adopting joint-supplier competitors ($p = 0.040$). The odds ratio is 1.133. Thus, as the average age of suppliers with ties to adopting joint-supplier competitors increases by 1, the odds that the focal firm adopts the innovation increase by 1.133.

Although average size and age may have an effect, we ran an additional test in which we studied the effect of the focal firm's largest and oldest supplier (measured by maximum size and age instead of the average) since one large or old supplier may have a different effect than the average effect of the focal firm's suppliers. In models 6 and 7, we test for this possibility. As indicated in the results, the magnitudes remain significant and scarcely differ in magnitude.

We also examined the sum of the size and age of the focal firm's suppliers. The results remain significant, while the magnitude decreases. As such, we believe that our results are robust to alternative specifications in testing hypothesis 2.

Table 6
Robustness checks for conditional fixed-effects logit results

Table 6. Conditional fixed-effects logit results

Model	5		6		7		8		9	
	IV = Age		IV = Size		IV = Age		IV = Size		IV = Age	
	Avg value		Max value		Max value		Sum		Sum	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
No. of indirect ties to adopting **joint-supplier** competitors (H1 +)										
Size of **suppliers** with ties to adopting joint-supplier competitors (H2 +)			1.390	0.008			1.190	0.001		
			(0.173)				(0.060)			
Age of **suppliers** with ties to adopting joint-supplier competitors (H2 +)	1.133	0.040			1.161	0.013			1.081	0.001
	(0.069)				(0.069)				(0.025)	
Number of **joint-supplier** competitors that subsequently change to digital (H3 +)										
No. of ties to adopting **direct** competitors										
Size (M6)/Age (M5 + 7) of adopting **direct** competitors	1.143	0.029	1.096	0.136	1.120	0.036	1.026	0.533	1.041	0.157
	(0.070)		(0.067)		(0.061)		(0.042)		(0.003)	
No. of ties to non-adopting **direct** competitors										
Size (M6)/Age (M5 + 7) of non-adopting **direct** competitors	0.951	0.356	0.992	0.764	0.961	0.385	0.998	0.749	0.993	0.394
	(0.052)		(0.025)		(0.044)		(0.007)		(0.008)	
Size (M6)/Age (M5 + 7) of adopting **joint-supplier** competitors	1.072	0.029	1.012	0.515	1.040	0.173	0.988	0.017	0.996	0.527
	(0.034)		(0.018)		(0.030)		(0.005)		(0.007)	
No. of indirect ties to non-adopting **joint-supplier** competitors										
Size (M6)/Age (M5 + 7) of non-adopting **joint-supplier** competitors	1.009	0.795	1.050	0.022	0.986	0.678	0.987	0.137	0.982	0.011
	(0.037)		(0.022)		(0.034)		(0.009)		(0.007)	
Size (M6)/Age (M5 + 7) of **suppliers** with ties to non-adopting joint-supplier competitors	1.069	0.307	0.694	0.003	1.030	0.577	1.015	0.652	1.027	0.100
	(0.070)		(0.086)		(0.055)		(0.033)		(0.016)	
Retail sales	0.969	0.355	0.946	0.115	0.962	0.263	0.932	0.050	0.947	0.125
	(0.033)		(0.034)		(0.033)		(0.033)		(0.033)	
Reputation	1.360	0.018	1.345	0.016	1.333	0.023	1.320	0.028	1.331	0.027
	(0.177)		(0.165)		(0.169)		(0.167)		(0.172)	
Degree centrality	1.367	0.007	1.294	0.028	1.330	0.013	1.180	0.138	1.246	0.052
	(0.159)		(0.151)		(0.153)		(0.132)		(0.141)	
Betweenness centrality	0.999	0.117	1.000	0.680	1.000	0.222	1.000	0.941	1.000	0.637
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Size	1.039	0.363	1.052	0.260	1.045	0.311	1.075	0.108	1.084	0.080
	(0.044)		(0.048)		(0.046)		(0.048)		(0.050)	
Percentage of titles distributed digitally	0.003	0.000	0.025	0.000	0.009	0.000	0.023	0.000	0.011	0.000
	(0.004)		(0.025)		(0.011)		(0.022)		(0.012)	
After penetration	6.971	0.001	5.485	0.003	6.372	0.001	7.838	0.000	7.795	0.000
	(4.107)		(3.089)		(3.709)		(4.419)		(4.532)	
Number of other firms that have adopted	0.935	0.364	0.993	0.917	0.928	0.328	0.982	0.776	0.935	0.357
	(0.069)		(0.065)		(0.071)		(0.064)		(0.068)	
Log likelihood	-67.127		-71.491		-67.300		-74.264		-68.952	
n	278		278		278		278		278	

We also ran models with a different dependent variable. In these models, we examined the first instance in which the focal firm changed its distribution model. With such operationalization, we did not have repeated events. Therefore, we decided to run a Cox event history model. The outcomes of these models are listed in Table 7 (models 10-13).

The results change significantly with this alternative dependent variable, where most effects become non-significant. The magnitudes retain their original sign, with the exception of the number of joint-supplier competitors that continue to adopt the innovation after initial adoption. This result may be an artifact of the data, as firms that have not begun to adopt the innovation even after other firms *continue* to adopt the innovation (in this short time period) have particular characteristics that may make adoption less beneficial for them. The overall decrease in statistical significance may be partly due to the 30% decrease (to 193 observations) in the already small sample size.

In Table 8, we again ran different specifications for our second hypothesis, where we examined age instead of size in model 14. The effect is positive and significant for age. Again, we also ran different specifications for the size and age of suppliers, examining the maximum in models 15 and 16 and the sum in models 17 and 18. The results are consistent with the effects found in the conditional logit models, further supporting hypothesis 2.

Given that the platform providers Microsoft and Sony may be driven by different factors to adopt, in an unreported robustness check, we also examined whether the results changed significantly when they were removed from the population and found no significant change.

Although the hypothesized effects are not fully supported across all our models, the overwhelming support across most models provides evidence that hypotheses 1 and 3 are partially supported (only when we use repeated events) and that hypothesis 2 is fully supported.

Table 7
Cox event history model results

Table 7. Cox event history model results with first adoption as the dependent variable

Model	10		11		12		13	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
No. of indirect ties to adopting **joint-supplier** competitors (H1 +)			0.038	0.301				
			(0.036)					
Size of **suppliers** with ties to adopting joint-supplier competitors (H2 +)					0.057	0.115	0.075	0.035
					(0.036)		(0.035)	
Number of **joint-supplier** competitors that subsequently change to digital (H3 +)							-0.170	0.189
							(0.129)	
No. of ties to adopting **direct** competitors	0.131	0.107	0.134	0.110				
	(0.081)		(0.084)					
Size of adopting **direct** competitors					0.031	0.006	0.031	0.004
					(0.011)		(0.011)	
No. of ties to non-adopting **direct** competitors								
Size of non-adopting **direct** competitors								
Size of adopting **joint-supplier** competitors					-0.006	0.442	-0.003	0.750
					(0.008)		(0.008)	
No. of indirect ties to non-adopting **joint-supplier** competitors								
Size of non-adopting **joint-supplier** competitors								
Size of **suppliers** with ties to non-adopting joint-supplier competitors								
Retail sales	-0.040	0.005	-0.039	0.006	-0.047	0.006	-0.049	0.005
	(0.014)		(0.014)		(0.017)		(0.018)	
Reputation	0.141	0.001	0.143	0.002	0.148	0.001	0.150	0.001
	(0.044)		(0.045)		(0.046)		(0.046)	
Degree centrality	0.179	0.003	0.168	0.008	0.153	0.014	0.172	0.014
	(0.060)		(0.063)		(0.063)		(0.070)	
Betweenness centrality	-0.000	0.016	-0.000	0.024	-0.000	0.016	-0.000	0.017
	(0.000)		(0.000)		(0.000)		(0.000)	
Size	0.098	0.000	0.098	0.000	0.105	0.000	0.104	0.000
	(0.018)		(0.018)		(0.021)		(0.022)	
Percentage of titles distributed digitally								
After penetration								
Number of other firms that have adopted	-0.007	0.128	-0.007	0.122	-0.007	0.150	-0.007	0.135
	(0.005)		(0.005)		(0.005)		(0.005)	
Log likelihood	-224.435		-224.307		-223.810		-223.429	
n	193		193		193		193	

Table 8
Robustness checks for Cox event history model results

Table 8. Cox event history model results with first adoption as the dependent variable

Model	14		15		16		17		18	
	IV = Age		IV = Size		IV = Age		IV = Size		IV = Age	
	Avg value		Max value		Max value		Sum		Sum	
	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value	Coef.	p-value
No. of indirect ties to adopting **joint-supplier** competitors (H1 +)										
Size of **suppliers** with ties to adopting joint-supplier competitors (H2 +)			0.076	0.026			0.011	0.020		
			(0.034)				(0.005)			
Age of **suppliers** with ties to adopting joint-supplier competitors (H2 +)	0.047	0.015			0.050	0.004			0.008	0.011
	(0.019)				(0.017)				(0.003)	
Number of **joint-supplier** competitors that subsequently change to digital (H3 +)										
No. of ties to adopting **direct** competitors										
Size (M13)/Age (M12 + 14) of adopting **direct** competitors	0.010	0.476	0.024	0.000	0.012	0.389	0.007	0.000	0.007	0.199
	(0.014)		(0.006)		(0.014)		(0.001)		(0.005)	
No. of ties to non-adopting **direct** competitors										
Size (M13)/Age (M12 + 14) of non-adopting **direct** competitors										
Size (M13)/Age (M12 + 14) of adopting **joint-supplier** competitors	-0.013	0.268	-0.007	0.318	-0.012	0.221	-0.002	0.451	-0.000	0.870
	(0.012)		(0.007)		(0.010)		(0.002)		(0.002)	
No. of indirect ties to non-adopting **joint-supplier** competitors										
Size (M13)/Age (M12 + 14) of non-adopting **joint-supplier** competitors										
Size (M13)/Age (M12 + 14) of **suppliers** with ties to non-adopting joint-supplier competitors										
Retail sales	-0.040	0.005	-0.049	0.009	-0.040	0.005	-0.040	0.009	-0.037	0.014
	(0.014)		(0.018)		(0.014)		(0.015)		(0.015)	
Reputation	0.145	0.001	0.145	0.001	0.143	0.001	0.140	0.002	0.144	0.001
	(0.044)		(0.046)		(0.044)		(0.045)		(0.045)	
Degree centrality	0.185	0.003	0.157	0.009	0.188	0.003	0.180	0.007	0.185	0.006
	(0.062)		(0.061)		(0.063)		(0.066)		(0.067)	
Betweenness centrality	-0.000	0.009	-0.000	0.010	-0.000	0.005	-0.000	0.022	-0.000	0.009
	(0.000)		(0.000)		(0.000)		(0.000)		(0.000)	
Size	0.100	0.000	0.105	0.000	0.101	0.000	0.095	0.000	0.094	0.000
	(0.018)		(0.022)		(0.018)		(0.020)		(0.019)	
Percentage of titles distributed digitally										
After penetration										
Number of other firms that have adopted	-0.007	0.144	-0.007	0.125	-0.007	0.128	-0.007	0.139	-0.007	0.129
	(0.005)		(0.005)		(0.004)		(0.005)		(0.005)	
Log likelihood	-223.813		-223.232		-223.537		-223.736		-224.017	
n	193		193		193		193		193	

Discussion

Our findings provide novel insights into innovation adoption. We show that (large) suppliers play an important role in the adoption process, and this finding has several important research implications.

We make several contributions to the innovation adoption literature. First, we show how different types of firms in the ecosystem may affect how innovations diffuse. Although previous research focuses specifically on firms that *can* adopt the innovation themselves (e.g., Compagni et al., 2015; Greve, 2011; Greve & Seidel, 2015), we pay specific attention to a type of firm that *cannot* adopt the innovation itself. Although attention has been devoted to other parties that cannot adopt the studied innovation, such as the mass media (Abrahamson & Fairchild, 1999; Burns & Wholey, 1993), we study a party that is within the focal firm's ecosystem. We show that suppliers share information regarding the innovation with their buyers and can, as such, be regarded as cross-pollinators of the ecosystem. If one does not include this party in the network, a spurious direct spillover effect may be observed between competitors. Therefore, we suggest that future research include all parties in the ecosystem when modeling the adoption of such an innovation in a particular industry.

Second, exploring the role of suppliers may elucidate the reasons that geographically proximate firms have a greater influence on the adoption decisions of the focal firm than more distant firms do. The main argument in this literature has been that information on the innovation is spread through interpersonal networks and that such networks are best developed among proximate firms (Greve, 2011). However, since suppliers are typically geographically close to their buyers (Martin et al., 1998), our findings elaborate on the previously identified effects of geographical proximity.

Third, we start to reveal the characteristics of suppliers that are relevant in influencing the focal firm's decision to adopt the innovation. Larger firms have been found to influence the

focal firm's decision to adopt more strongly than smaller firms (Burns & Wholey, 1993; Haunschild & Miner, 1997). We find that such characteristics also play a role in the persuasiveness of suppliers in sharing information on an innovation.

Fourth, continued adoption has been found to influence other organizations to adopt as well. Whereas initial adoption may hint to other organizations about the benefits of the innovation and may create an institutional pressure to adopt, continued adoption can provide a signal to other organizations on the benefits of adoption. Hence, although initial adoption may be important, the innovation adoption literature can benefit from also studying the extent of adoption.

Limitations and suggestions for future research

Notwithstanding its contributions, this study has limitations that suggest areas for future research. We have focused on a fundamental feature of the firm: its distribution model. Competitors may be especially reluctant to provide information regarding their distribution models, which constitute a core feature of their activities. Studying the influence of direct and joint-supplier competitors in other types of innovations may extend the generalizability of the mechanisms we found. Furthermore, qualitative work in this area may uncover more granular accounts of these different mechanisms.

In this study, we did not measure the performance outcomes of employing different distribution models. The performance outcomes of learning from direct competitors may differ from those of learning from joint-supplier competitors. Since we do not have digital sales data, we are unable to answer this research question in this setting. Although difficult to acquire, information acquired from direct competitors may entail more specifics regarding the implementation of the new distribution model, whereas suppliers may fall short in providing such information. Although we observe that firms learn from their suppliers and we cannot conclude that they learn from their direct competitors, those few firms that are able to learn from their direct competitors may benefit more from having information regarding the

implementation of the distribution model. Thus, studying the performance consequences of learning from different sources may prove fruitful.

We investigated the console video game industry, which is competitive and rapidly changing (Venkatraman & Lee, 2004). Whether the same results hold for other industries remains an area for future research. First, the results are likely to apply to other cultural industries, and the nature of relationships between buyers and suppliers is similar. Second, we believe that the results hold for other competitive, rapidly changing industries, but research on whether the proposed mechanisms apply the same in stable and less competitive industries is also warranted.

Finally, in this industry, a significant number of buyers (video game publishers) are also suppliers (developing games in-house). This may also have implications for the generalizability of the study, as buyers would be more aware of the behavior of suppliers. Such awareness may help buyers to better defend against knowledge spillovers. On the other side, suppliers may have an additional incentive to share information with other buyers, since the buyers are competitors by virtue of their own game development activities. Hence, replicating this study's findings in other settings is warranted.

Conclusion

In closing, we view this study as an important initial step in determining how an innovation diffuses in an established industry. We find that competitors learn about the costs and benefits of an innovation through their mutual suppliers. That is, suppliers serve an important role in this adoption process as cross-pollinators between the different competitors in an industry. Large suppliers are especially influential. We hope that these insights stimulate further work in the literature on innovation adoption.

Chapter 6

Main findings and conclusions

Organizational change is difficult. It requires strong motivation such as performance shortfalls (Cyert & March, 1992). In this dissertation, I have taken a behavioral perspective on organizational change, specifically studying the role of the decision-maker. In general, this dissertation contributes to the organizational theory and strategy literatures by showing when, why, and which organizational changes are adopted. The individual papers make the following contributions.

The first essay (chapter two) – *Business model change: Managerial roles and tactics in decision-making* – uncovered two tactics, leveraging external agreements and continuously informing top managers, that allow middle managers to convince top managers to accept a business model change initiative. These findings extend – and to some extent modify – the literature on managerial roles in change initiatives. Specifically, Burgelman (1983b) found that middle managers who had identified opportunities for new activities generally needed to develop awareness about the promise of these new activities without revealing their plans prematurely. This view might have become somewhat outdated, given the growing intensity of corporate information and control systems and the tightening of organizational slack under global competition (Bartlett & Ghoshal, 1998; Martin, 2014). In my case, middle managers were more open to top management from the onset, and used more visible decision-directing tactics. As such, my findings represent an alternative configuration to the covert resource and communication pathway that Burgelman (1983b) described.

My findings also inform the business model literature. Although recent advances have

begun examining the process of business model change and its various stages, we know relatively little about how such processes progress from stage to stage, which my study elucidates. Conceptually, I argue that middle managers are well positioned to recognize and seize opportunities for business model change or innovation, but also that they can then drive the process of deciding in favor of the change. Empirically, I elucidate that middle managers attempt to direct top management's business model change decisions by leveraging external agreements and by continuously informing them about the progress of research on initiatives. I thus advance a view of business model change and innovation as a longitudinal decision-making process, within which specific mechanisms and roles can be studied in depth. Rather than the recent emphasis on top management and individual leadership (see also Sosna, Trevinyo-Rodriguez, & Velamuri, 2010; Svejenova, Planellas, & Vives, 2010), I develop a perspective that sees business model change as a middle-up sense-making process that proceeds via the continuous provision of information. Finally, the novelty of my findings relative to the extant organizational change literature (described above) suggests that the tactics and other processes involved in business model change may differ in structural ways from those involved in other types of organizational change. That is, business model changes are more fundamental in terms of economic impact, more complex, and involve more critical economic partners, given that business models pertain to the very logic of how organizations create, deliver, and capture value with its buyers, suppliers, and economic partners (Amit & Zott, 2001; Zott & Amit, 2010).

The second essay (chapter three) – *Clear blue water: The mediating role of politics in the board diversity-organizational innovativeness relationship* – contributes to the literatures on board diversity, decision-making, and innovation. The findings in the board diversity literature have been inconsistent. The diversity literature is specifically in need of further insights into the mechanisms by which diversity has an effect on various outcomes (Lawrence, 1997). Thus, instead of looking at the direct effects of board diversity on innovativeness, I

focus on explaining and testing the mechanisms by which board diversity influences innovativeness. I introduce a new concept, stakeholder diversity, which reflects the differences in members' interests.

For the decision-making literature, the study contributes by finding the importance and significant negative influence of political board of directors' decision-making on innovativeness.

On another note, this study adds to the innovation literature. It shows that board of directors' decision-making should be considered an important antecedent to innovativeness, and it should be recognized as an important indicator for innovativeness. So far, the degree politics in decision-making is underemphasized in literature on innovativeness. The results of this study thus have important implications for future research on innovativeness. Additionally, this study shows the indirect negative effect of stakeholder diversity on innovativeness. Past research has shown that paying attention to stakeholders increases firm innovativeness (Flammer & Kacperczyk, 2016), yet I show that having the interests of stakeholders reflected in the board will decrease firm innovativeness. Nevertheless, such reflection could have other (symbolic) consequences, such as more stakeholder support that eventually can increase firm performance (Henisz, Dorobantu, & Nartey, 2014).

The third essay (chapter four) – *Being in deep water: Negative attainment discrepancy, organizational attention, and interorganizational relationship formation in the Dutch water authority sector* – contributes to the call for 'a behavioral theory of the interfirm' by specifically looking at how attention-based and behavioral concepts influence the organization's propensity to form a shared facility through an IOR (Baum & Ingram, 2002; Gavetti et al., 2012). By synthesizing the attention-based view with the behavioral theory of the firm, we show that the attention-based view can be extended to explain *when* and *which* organizational changes will be made. In particular, we show how organizational attention shapes the search procedure and eventually directs the decision towards IOR formation or not.

I also provide a contribution to the IOR formation literature by focusing on an overlooked type of IOR: cost-reducing IORs. The bulk of IOR formation research is on IORs designed to increase the innovation output of the focal firm (e.g. Ahuja, 2000b; Eisenhardt & Schoonhoven, 1996; Lee, 2010a). Cost-reducing IORs are rarely studied. A notable exception is Gimeno (2004), who looked at how the formation of IORs by rivals influences the focal firm to form an IOR in the global airline industry. IORs are formed for a variety of reasons (Oliver, 1990), thus focusing on another major motivation than innovation helps inform a more general view of IOR formation and eventually consequences.

The fourth essay (chapter five) – *"In this world, it's copy or be pasted": The role of suppliers in innovation adoption* – generates novel insights on the adoption of an innovation. I show that (large) suppliers play an important role in the adoption process. This has several important research implications. I make several contributions to the innovation adoption literature. First, although previous research focuses specifically on firms that *can* adopt the innovation themselves (e.g. Compagni et al., 2015; Greve, 2011; Greve & Seidel, 2015), I pay specific attention to a type of firm that *cannot* adopt the innovation itself. Although attention has been paid to other parties that cannot adopt the innovation, such as the mass media (Abrahamson & Fairchild, 1999; Burns & Wholey, 1993), I study a type of firm that is part of the focal firm's ecosystem. I show that suppliers share information regarding the innovation with their buyers and can as such be seen as cross-pollinators of the ecosystem. If one does not include this party in the network, a spurious direct spillover effect may be observed between competitors instead. Therefore, I suggest that future research include more parties in the ecosystem when modeling the adoption of such an innovation in a particular industry.

Second, I start to uncover the characteristics of the suppliers that matter for their influence on the focal firm's decision to adopt the innovation. Larger firms have been found to have a stronger influence on the focal firm's decision to adopt (Burns & Wholey, 1993; Haunschild & Miner, 1997). I find that such characteristics also play a role in the

persuasiveness of suppliers in their sharing of information on an innovation.

Third, continued adoption by the focal firm has been found to influence other organizations to adopt as well. Although initial adoption may provide a hint to other organizations about the potential benefits of the innovation and may create an institutional pressure to adopt, continued adoption can provide a signal to other organizations on the benefits of adoption. Hence, although initial adoption may be important, the innovation adoption literature can benefit from also studying continued adoption.

This dissertation not only provides theoretical contributions, but is also unique in other ways. First, essays one, two, and three employ a unique research setting, the Dutch water authority sector, which has not been studied in the organization theory and strategy literatures. Studying the same complex phenomenon in different settings alleviates the risk that we build knowledge that is simply idiosyncratic to a single setting, e.g. the vast amount of studies in the interorganizational relationship literature are in the biotechnology industry; my third essay refreshes this research by studying a different setting. Of course, the Dutch water authority sector is not without its own idiosyncrasies, thus replications in different settings are warranted.

The behavior of the parastatal water authorities fitted the theoretical assumptions of behavioral theory neatly (e.g. satisficing instead of maximizing). They are unique inasmuch as they can be seen as business firms given their clear tasks (managing water barriers, for maintaining the level and quality of water in waterways, and for sewage treatment in their respective regions), yet also have a top management that is elected and can levy their own taxes. Their visibility to the public as parastatal organizations makes them less risk seeking, increasing the relevance of studying their organizational change efforts. However, this visibility makes them also more inclined to provide unique and in-depth data (in most cases they are obliged to provide the data), making them an ideal object of study.

Second, in particular essay two and three, and to some extent essay one, capitalize on the aforementioned data, which are minutes of meetings of top management teams and board of

directors. Gathering a fine-grained data on a large number of organizations (the total population) in different years requires a considerable amount of effort. Yet, if we want to move forward in the field of organization theory and strategy, we will need to do this. We will need to develop and test theory on large scale samples (or better yet, populations) while still being able to exactly pinpoint the actors that are responsible for the actions of the organization. Only then might we be able to move from testing associations between concepts to testing causation.

Third, I also make several methodological contributions. Each essay employs a different method: a qualitative case study research design for essay one, topic modeling for essay two, word count content analyses for essay three, and a more conventional quantitative approach in essay four. In essay one, I started with archival documents and then generated further inferences via interviews. This is not unprecedented, even in strategic management (Crossan & Berdrow, 2003) - but this is not typical in organizational change research, where most qualitative research follows a classical ethnographic approach starting with and primarily based on interviews (e.g. Dutton et al., 2001; Howard-Grenville, 2007; Piderit & Ashford, 2003). Yet archival documents can be especially valuable as a primary data source for research on change decision-making, for three reasons. First, evidently, the contents of the documents may be used to uncover different tactics. Specifically, accessing the original documents used as inputs into decisions (as opposed to just minutes or ex post reports) provides a direct window into how managers framed the decision. Second, the frequency and type of documents may provide evidence for a certain type of tactics, as it did in this study. Third, the very choice of language used in writing such documents may be an issue selling tactic in itself (Sonenshein, 2006). When studying the framing and selling of change initiatives, any biases discovered when examining archival documents can actually inform the research. In addition, despite their many strengths, interviews by themselves may invoke not only recall but also rationalization biases arising from interviewees' beliefs about who directed the decision.

Of course, archival and interview sources can be complementary (as in my research,

and many other studies). Overall, I show that an approach starting with in-depth analysis of the archival documents that served as inputs into decisions is suited to the study of organizational change decisions. Furthermore, this is all the more so when the decisions under study unfold over long periods and challenge traditional managerial roles, two conditions that exacerbate the risk of bias in retrospective interviews. I believe that this definitely applies to decisions about business model changes, among others, but further comparative research would be required to confirm under what conditions my research approach is preferable to conventional interview-led techniques for studying decision-making about organizational change more generally.

In essay two, I created new measures for political decision-making, and the innovativeness of an organization. I introduce the new construct stakeholder diversity, which I measure by taking into account the diversity of interest of the board members. For politics, I provided an overview on the measures used in previous studies. Based on this overview, I formulated a new measure/dictionary based on content analysis, which forms a novel measure as contribution. Another aspect of this is that politics is measured quantitatively in this study. So far, most studies used a qualitative approach, most often in the form of case studies. This quantification of the variables will hopefully contribute to revitalizing the decision-making literature. For innovativeness, I formulated a new output measure based on an adapted version of content analysis. This method is generalizable to many other industries and situations, contributing to a solution for the reported difficulties in finding a reliable and generalizable method for measuring innovativeness.

In essay three, I make a methodological contribution by showing that applying topic modeling on the (internal) minutes of top management, board of director, and committee meetings can be used to measure organizational attention. Ordinary ways of measuring this construct, such as interviews and (word count) content analysis from letters to shareholders have been criticized. Interviews may suffer from issues of reliability and replicability, whereas letters are written to convey positive impressions of the organization, are designed for specific

business audiences, and are likely written by communication personnel rather than the top managers (Surroca et al., 2016). Given that topic modeling on (internal) minutes is not affected by these problems, it is significantly superior in terms of its internal and external validity. Using topic modeling, one is also able to unobtrusively capture broader categories of attention, which would be nigh impossible to do for word count content analyses.

Overall, the dissertation contributes to the literature on organizational change by studying when, why, and which organizational changes are adopted. Jointly, the dissertation shows that organizations adopt changes when the decision-making process of the board of directors is less political (essay two), top management is confronted with negative attainment discrepancy (essay three), and when specific external constituencies start or continue to adopt a particular change (essay four). The dissertation also explicates why organizations change. Middle managers play an important role in convincing top management through the use of various tactics of the need of organizational change (essay one) and top management is motivated to search for solutions in the adversity of negative attainment discrepancy (essay three). Last, the dissertation shows that in particular those organizational changes are adopted which are (1) proposed by middle managers that tie the change initiative to broad strategic agreements of the organization and continuously inform top management on the initiative (essay one), (2) in line with the organizational attention of top management, e.g. when organization attention is on collaboration, the organization is more likely to form an IOR as form of governance change (essay three), and (3) (continued) adopted by joint-supplier competitors, where bigger suppliers play a more prominent role (essay four).

In sum, essay one shows that middle managers play a prominent role in proposing organizational change, although their willingness to propose such changes may be dependent on the degree of politics as speculated in essay two. Essay three then shows that the motivation and attention of the top manager is important, which may in part be driven by the initiatives and issues sold by middle managers. Essay four completes the picture by providing another

perspective showing that ideas for change do not only come from within the organization, but similar organizations in the focal organization's environment play a large role as well.

Limitations and suggestions for future research

General limitations

The studies in this dissertation also need to be replicated in order to create repeatable, cumulative knowledge (Bettis, Helfat, & Shaver, 2016). I collect forms of population data for all four essays, thus there is no major concern regarding generalizing the results to the corresponding population. However, one can replicate the study in a different context or with different research methods (Bettis et al., 2016). The water authority sector, while of great importance to study, at least for the territorial well-being of the Netherlands, comes with its own idiosyncrasies. Hence, important caveats apply.

First, my qualitative work done for the first essay shows that water authorities typically comply with the assumptions of the behavioral theory of the firm. Yet, as also argued in chapter 4, decision-makers in this context may have less incentives to proactively solve upcoming problems. Therefore, some of the factors, like negative attainment discrepancy, have a more immediate effect in this setting, while in other settings, negative attainment will sought to be solved when it is predicted to exist. Thus, the overall findings would need to be replicated to observe whether the temporal dynamics are similar for traditional business firms.

Second, water authorities do not face product-market competition. As a population of organizations, they can only be dismantled by the national government. Even then, their existential right is vested in the constitution, thus dismantling these organizations would require a change in the constitution with all the necessary onerous procedures involved. This has important implications the fourth chapter. There, it is of interest to understand how attention to similar organizations would play a role in a more traditional business setting, given that competitive pressures may exacerbate the tendency of firms to form a shared facility through an

IOR.

Third, the role of top management in this setting is more restricted to approving and deciding on organizational change, rather than being the source of change itself. This is more unique to these organizations compared to regular firms. Hence, it may be easier for middle managers to bring initiatives to the attention of top management in our case study, since these initiatives do not as strongly compete with the ideas of top management as in firms. This is especially relevant for chapter 2. Also, continuous informing top management will likely be more difficult in other settings as top managers do not only decide on, but are also a source for organizational change. Moreover, top managers and directors in the water authority are, by virtue of being elected, more politicians than water managers. As such, they may be especially mindful of these external agreements and complying with them than managers would.

Fourth, the water authorities' board of directors' tasks are similar to those of public firms, yet some subtle differences exist. The primary role of the board of directors is restricted to engaging in decision control. Although the directors are all responsible for the appropriate execution of the water authority's tasks, directors' opinions on how this should be done may vary. Especially their role as representative for a certain category may influence this. For instance, a representative from agriculture will more likely seek to secure funds for projects that benefits local farmers. After their term, a more successful representative is more likely to be re-nominated (or re-elected); which is one of the prime individual goals of the directors. This has important implications for the third chapter, as this means that a homogeneous board may be more fruitful for the acceptance of innovation proposals. However, when the board also has other roles, such as initiating innovation proposals, stakeholder diversity can have a different effect as it allows for the inclusion of more perspectives (Dyer & Hatch, 2006; Krause et al., 2007). Overall, thus, replication in different settings is warranted.

One could also use different research methods, e.g. by using alternate proxy variables for the concepts I have studied in this dissertation. One could for instance use surveys to

measure politics as discussed in the third essay. In time, undoubtedly different methods and models will be developed that will allow researchers able to get an even better grip on the exact causal relationships among constructs. As those methods and models are developed, I encourage researchers to thoroughly test the findings from these essays. However, for each of essays one, two and three, I have revisited a relevant manager to check the internal validity of the findings of these essays, which she endorsed.

Specific limitations

Notwithstanding the contributions of this dissertation, limitations remain. In essay one, I have looked at a business model change initiative and what tactics middle managers employ to persuade top managers for the initiative. Although I argued conceptually about differences between business model change and other forms of organizational change, further work, including empirical tests, would be necessary to understand exactly what is different and similar about the business model change concept. Such studies would pave the way for more research on business model change and broaden the understanding of organizational change more generally.

In essay two, I juxtaposed the stakeholder diversity concept with gender diversity and empirically showed their different effects. Given data limitations, I did not juxtapose the stakeholder diversity concept with other types of diversity (e.g. diversity in functional background). Further exploring how stakeholder diversity differs from other diversity concepts, especially in the mechanisms linking them with various outcomes, remains warranted.

In essay three, I showed that looking at negative attainment discrepancy and organizational attention in tandem allows us to predict when and which decisions will be made. However, I only have shown this to be correct in one instance: when the decision concerns governance change. I hope that this demonstration does inspire future research to explore different types of decisions and different foci of organizational attention.

In essay four, I studied the role of suppliers and joint-supplier competitors in the

adoption of an innovation. I based my theory on the imitation model by Haunschild and Miner (1997), yet more factors may play a role in the adoption of an innovation when it is facilitated by suppliers, as I uncover. Thus, one can further explore which factors can influence the susceptibility of the focal organization to be particularly inclined to imitate the newly adopted practices of joint-supplier competitors.

Conclusion

In closing, the potential avenues for future research portrayed here are intended to serve as inspiration for more work on organizational change. Essays one and two have extended lines of research by adding new issue selling tactics in the case of business models, theorizing the differences between 'ordinary' organizational change and business model change (essay one), and showing the impact of politics on organizational innovativeness (essay two). Essays two, three, and four redirect lines of research by introducing a new type of (board) diversity (essay two), by synthesizing the attention-based view and the behavioral theory of the firm (essay three), and by introducing the role of the supplier in the adoption of innovations (essay four). Therefore, in the end, this dissertation does not only provide answers, but also forms more questions, as research should.

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